

State of California
The Resources Agency
Department of Water Resources
Northern District

DWR-HAMILTON RANCH MANAGEMENT PLAN

November 1994

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FOREWORD

As one of the State's premier rivers, the Trinity River supports valuable wildlife habitat, provides a wide range of recreation and water-related benefits, and is one of the major producers of salmon harvested in the State's Indian, sport, and commercial salmon fisheries. Fish are primary water users, and their welfare is viewed by most people today as essential in a State that has experienced massive declines in many fish populations over the last several decades.

The Department of Water Resources, as a member of the Trinity River Task Force, is committed to helping restore the fisheries of the Trinity River Basin. In conjunction with the Task Force's other activities, the Department purchased approximately 90 acres of land in 1985 at the mouth of Grass Valley Creek, a tributary to the Trinity River, to build several sediment control pools and to store future sediment.

This report is a management plan for that property; it includes a description of the past work done on the property and recommends future work for sediment control and disposal.

This report was funded through the Trinity River Basin Restoration Program, under which costs are shared 85 percent federal, 7-1/2 percent California Department of Fish and Game and 7-1/2 percent DWR.

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CONTENTS

	<u>Page</u>
CHAPTER 1	1
SUMMARY	1
Objectives of the Management Plan	2
Recommendations	2
Findings	5
CHAPTER 2	7
INTRODUCTION	7
CHAPTER 3	11
CHRONOLOGY OF ACTIVITIES AT DWR-HAMILTON RANCH . . .	11
Background	11
History	11
Recent Activities	13
CHAPTER 4	15
TOPOGRAPHICAL FEATURES OF DWR-HAMILTON RANCH . . .	15
General Vicinity Description	15
Soils	16
Climate	17
Hydrology	18
Water Rights Issues	21
Water Use at the DWR-Hamilton Ranch	21
Social Description	22
CHAPTER 5	25
THE GRASS VALLEY CREEK SEDIMENT CONTROL SYSTEM . . .	25
Construction Costs and Capacity of the Sediment	
Control Pools	27
Sediment Control Pools on the DWR-Hamilton	
Property	27
Pools at the Mouth of Grass Valley Creek . . .	31
Southern Pacific Land Company-BLM Pool	32
Ponderosa Pines Pool	33
River Access Through the Ponderosa Pines	
Subdivision	33
Poker Bar Pool	34
Stott Hole	34
Equipment Access to Poker Bar	35
Lower Poker Bar Pool	35
Snell Pool	35
Steel Bridge Hole	36
River Between Steel Bridge Road and Indian Creek	36
Indian Creek Pool	36
Sediment Flushing Flows	36
Sediment Transport Study	37
Capacity Evaluation of the Sediment Control System	
.	37

CHAPTER 6	39
SEDIMENT DISPOSAL ON DWR-HAMILTON RANCH	39
Designated Wetlands in Primary Disposal Area	43
Wetland Seep in Primary Disposal Area	44
Preserve and Fill Around the Seep	45
Fill Over the Seep, and Compensate for Loss at Other Locations	45
(1) Increase Area of the Emergent Marsh Between GVC and Lewiston Road	47
(2) Construct Wetlands in Area West of Grass Valley Creek	47
(3) Enlarge the Old Dredger Ponds	49
(4) Excavate Sediment From the River Backwater Area	49
(5) Increase Wetlands in Sediment Control Pools	49
Enhance the Seep Habitat by Rerouting Snipe Gulch Drainage into the Primary Disposal Area	49
CHAPTER 7	53
ENVIRONMENTAL ISSUES	53
Existing Wildlife Habitat	53
Wildlife Habitat at Pool Sites and Primary Disposal Area Prior to Construction	54
Revegetation Plan	58
Current Wildlife Habitat Work	58
Fishery Improvement Projects	59
Future Wildlife Habitat Work	59
CHAPTER 8	61
RECREATION DEVELOPMENT AT DWR-HAMILTON RANCH	61
Present Public Recreation Access	61
Future Recreation Development	62
Trinity River Fishing Access	62
Picnic Area on West Side of GVC	62
River Raft Access and Stopover Site	63
Recreation Use of Sediment Control Pools	64
CHAPTER 9	65
MANAGING THE PROPERTY	65
Proposal to Remove all Structures From State Land Pump Irrigation System	65
Invasive Plant Species	66
Surplus Land Disposal	67
Conflicting Property Rights	68
Construct a New Sediment Control Pool Upstream of Existing Pools	69
Construct a New Sediment Pool Downstream of Existing Pools	70
Other Management Considerations	70

FIGURES

	<u>Page</u>
FIGURE 1 DWR-Hamilton Ranch and Features of the Central Valley Project	ix
FIGURE 2 Location of Grass Valley Creek Sediment Control Sites	8
FIGURE 3 Features of the DWR-Hamilton Ranch	12
FIGURE 4 Sediment Control Pools in Grass Valley Creek and the Trinity River	26
FIGURE 5 Potential Fill in Sediment Control Pools	29
FIGURE 6 Profile of Upper and Lower Pools, Grass Valley Creek	30
FIGURE 7 USCE Jurisdictional Areas	41
FIGURE 8 Wetlands in the primary Disposal Area	42
FIGURE 9 Potential Wetland Areas	46
FIGURE 10 DWR-Hamilton Ranch Habitat Types	56

TABLES

TABLE 1 Sediment Removal Costs and Pool Capacity	28
TABLE 2 Potential Fill Volume at DWR-Hamilton Ranch Pasture Disposal Area	40
TABLE 3 Areas of Habitat Types at the Hamilton Site	57

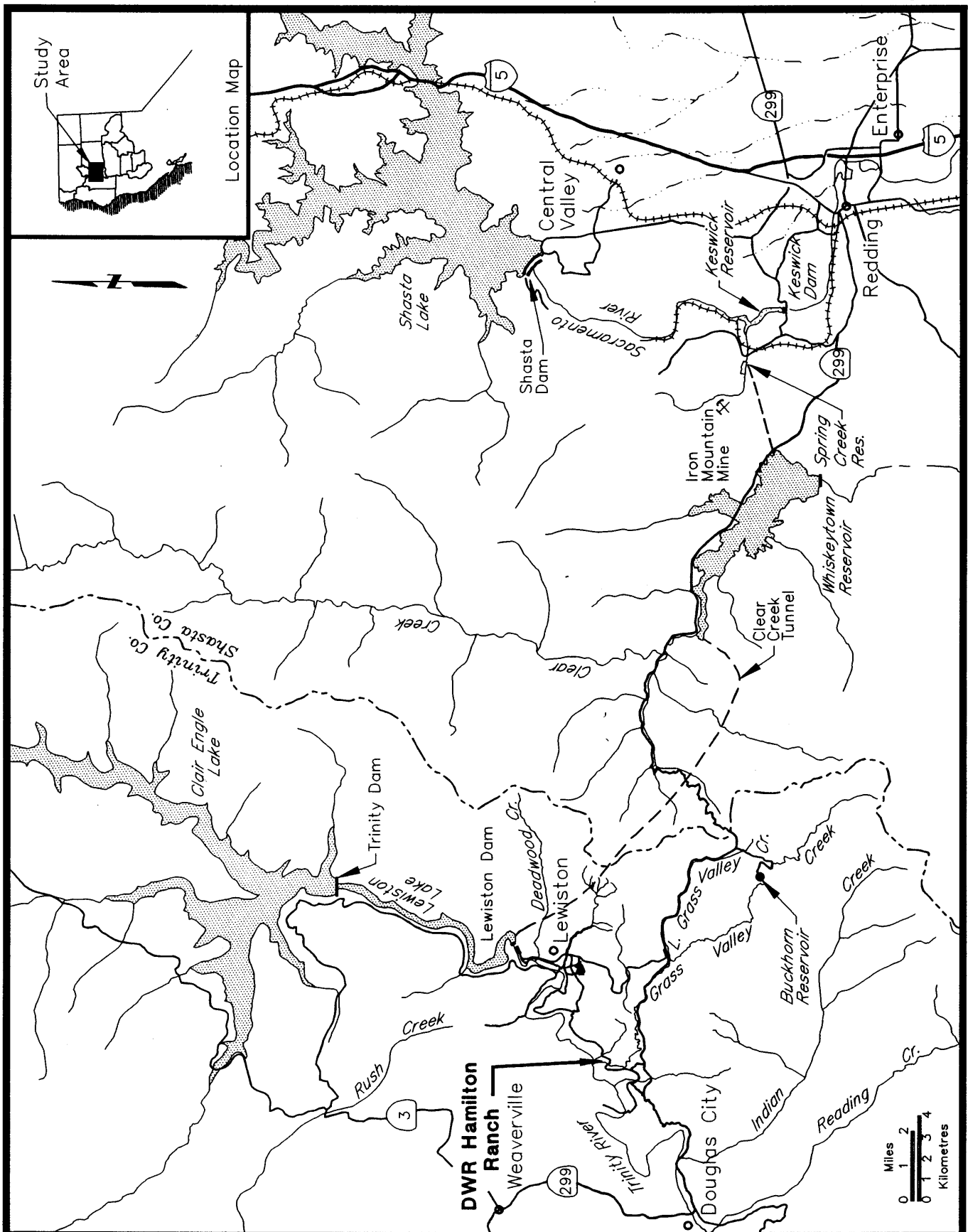
APPENDICES

APPENDIX A Reports Related to the DWR-Hamilton Ranch and the Sediment Control System	75
APPENDIX B DWR-Hamilton Ranch Irrigation System	81
APPENDIX C Maps	89
APPENDIX D Permits	95
APPENDIX E Water Rights Information	107
APPENDIX F Construction of DWR Pools	125
APPENDIX G Primary Disposal Area - Wetland Transects and Piezometer Water Levels	131

ABBREVIATIONS USED IN THIS REPORT

CCC - California Conservation Corps
CDF - California Department of Forestry
DBH - Diameter at Breast Height
DFG - Department of Fish and Game
DG - Decomposed Granite
DWR - Department of Water Resources
GVC - Grass Valley Creek
Ranch Ditch - Irrigation Diversion Ditch
RCAA - Redwood Community Action Agency
SWRCB - State Water Resources Control Board
Task Force - Trinity River Basin Fish and Wildlife Task
Force
USBR - U.S. Bureau of Reclamation
USCE - U.S. Army Corps of Engineers
USF&WS - U.S. Fish and Wildlife Service
YST - Yellow Star Thistle

Figure 1



California Department of Water Resources, Northern District
DWR-Hamilton Ranch and CVP Features

CHAPTER 1

SUMMARY

The Department of Water Resources owns 90 acres of land in Trinity County referred to as the DWR-Hamilton Ranch. This land was purchased to provide a site for constructing sediment control basins on Grass Valley Creek and for permanently storing material dredged from the creek and the Trinity River. Under State ownership, the property has provided wildlife habitat and public recreation access to the Trinity River and Grass Valley Creek.

This report provides a brief history of the property, formerly part of the historic Lowden Ranch, and documents activities carried out by DWR since the DWR-Hamilton Ranch was purchased in 1985. This report also provides a guide for continued management of the site, and the sediment control system downstream.

The goal of the DWR-Hamilton Ranch project is to reduce or eliminate sediment discharge to the Trinity River from GVC. The project will be operated in conjunction with the Buckhorn Mountain Dam and ongoing watershed restoration efforts. Reducing sediment in the Trinity River will help maintain pools for shelter and cover, keep spawning gravel from becoming cemented with sediment, and protect benthic organisms from being covered by moving sand.



Buckhorn Mountain Debris Dam. The spillway is on the right, the outlet works are in the center of the dam.

Objectives of the Management Plan

There are several objectives to State ownership of DWR-Hamilton Ranch. Some uses are conflicting. Therefore, compromises will be necessary to carry out the following objectives:

1. Construct sediment control basins in GVC and the Trinity River to reduce decomposed granite accumulation in the river.
2. Provide permanent storage for sediment removed during construction, and periodic maintenance dredging of the sediment control pools.
3. Make surplus topsoil, DG sand, and materials excavated during pool construction available for local use, thereby extending the useful life of the storage area.
4. Improve fishery habitat in the Trinity River near the DWR-Hamilton property by constructing spawning riffles, resting pools, and possibly a side-channel rearing area.
5. Maintain or increase wildlife habitat through vegetation management in areas that are not needed for ongoing sediment control activities.
6. Provide public walk-in day-use access for fishing, hiking, swimming, and nature study.
7. Improve the appearance of the property by selective planting and irrigation.

Recommendations

1. Evaluate the need to construct new sediment pools in GVC. This evaluation should include sediment transport estimates from GVC since construction of the Buckhorn Debris Dam, with consideration of ongoing watershed restoration activities.
2. Establish wetland vegetation on the banks of the lower sediment control pool. Reeds and rushes should be transplanted in shallow areas constructed for this purpose. Alders and willows should be transplanted to the banks near the water line.
3. The GVC irrigation diversion should be used at least once every five years to keep the appropriative water right in effect.
4. A new wetlands delineation in the former pasture area, now designated as the primary disposal area, should be

requested from the U.S. Corps of Engineers. This area has not been irrigated for several years; portions of the previously designated jurisdictional area are now dominated by upland vegetation.

5. An electric irrigation pump used to provide water for establishing vegetation on the disposal sites should be improved to increase its productivity. An intake channel backfilled with coarse gravel should be constructed to divert water from the lower sediment control pool to the pump sump.
6. A property line survey is needed to establish corner monuments on the east property line.
7. A fence should be installed on the upper terrace property boundary. Livestock from adjoining property graze on this State land without restriction.
8. Several special problems need to be solved. These relate to maintenance of private ditches crossing State lands and State-owned ditches crossing private land. Others involve private structures on State land and access to private property through State land.
9. Fishery and wetland habitat should be improved in the Trinity River along the State land. Restoration of a spawning riffle (designated as Riffle I in earlier studies), construction of a juvenile fish rearing channel, and enhancement of wetlands in the nearby backwater area at the northwest corner of the property should be evaluated.
10. The caretaker residence should continue to be maintained by the State. The caretaker is necessary to limit vandalism, clean up litter, and collect on-site data. The residence is presently maintained by the caretaker, with out-of-pocket costs reimbursed by the State.
11. Periodic monitoring and evaluation of environmental restoration efforts are necessary. Baseline reports of vegetation and other conditions should be compared in evaluating the work.
12. Alternative methods for excavating sediment with either conventional earthmoving or suction dredging equipment should be evaluated.
13. The DWR-Hamilton Ranch is in an "open range" area. This means a property owner is responsible for keeping other people's livestock off his own property.

Therefore, fence lines should be maintained. This should include trimming overhanging vegetation that might otherwise damage the fence. Special attention should be given to clearing both sides of the chain link fence on the north and west lines. These fences are offset from the property line for this purpose.

14. Low-cost wildlife enhancement measures should be continued. Some of these include installing nest boxes for wood ducks, boring holes in tree trunks for nesting, constructing brush cover piles and leaving snag trees for feeding and nesting. Ceanothus integerrimus or deer brush should be planted on the disposal site's north slope to provide forage for deer.
15. Public walk-in day use should continue to be permitted on the property. Restrictions on camping and other overnight activities should be continued. Because the site is near residences and is open to the public for other uses, hunting should not be allowed.
16. As population increases, we can expect additional public use of the property. As implementation of the Trinity River Management Program leads to increased fish returns, more fishing can be expected. Litter barrels and chemical or pit toilets should be installed. Funding will be needed for their installation and maintenance.
17. Surplus topsoil, spoil from the sediment control pool excavation, and any rejected material from gravel screening work should be made available to local people for off-site use. This will extend the life of the property for sediment storage. Under State laws, surplus material must be sold.
18. An inventory should be maintained of property owners who want material from the sediment control ponds to be deposited on their property.
19. A wetland area is located in the middle of the primary disposal area. To maximize sediment storage volume, this area could be covered with fill. As mitigation, the emergent marsh area near Lewiston Road might be extended to the west.
20. The sediment trap pools have shallow areas constructed on the west side. At the upper pool, California Department of Forestry conservation crews transplanted reeds and rushes into the shallow areas. Similar plantings on the west side of the lower pool will be made in the future. As this vegetation spreads, new wetlands are being established. These areas should be included during any wetland inventory.

21. If, during future pool construction, material is located that is suitable to screen for spawning gravel, it should be stockpiled in open areas on the old gravel tailings. Larger rock should be stockpiled for use as erosion control on the pool banks.

Findings

1. The Trinity River channel near the northeast corner of the property might be deepened into a pool to provide resting pools for migrating fish and to increase sites for fishing. Some of the excavated material from the pool could be used to build a riffle in the channel upstream. Additional material might be used to build a rearing channel along the south bank between the new pool and the backwater area near the Riffle I site.
2. Snipe Gulch outflow has been channeled along Lewiston Road, and flows through a 4-foot culvert near the upper sediment control pond. This sometimes fills with sediment and causes flooding of the road. The historic drainage was through the pasture area. In conjunction with a study of ways to compensate for use of the pasture for sediment storage, relocation of Snipe Gulch to its historic alignment should be investigated.
3. Additional sediment control pools are needed to capture the estimated total sediment load of GVC. Potential sites include: (1) an off-channel pool on State property east of GVC; (2) a pool on GVC upstream from the upper pool (A pool constructed here would require additional land. A lease, or easement, might be used to provide access if the adjoining owners are agreeable.); (3) widening of the existing pool on private property near the mouth of GVC; (4) a new pool constructed on private property upstream of the Lewiston Road bridge.
4. Construction of a high-flow sediment pool below the existing DWR pools would probably improve wildlife values and may compensate for some wetland losses. Construction may also reduce the potential amount of sediment to reach the river should the Wellock Pool fill during a large flow event.
5. Land containing the lower portion of the Southern Pacific-BLM pool could be purchased from the private owner to insure future rights to maintain the pool. Another parcel adjacent to the Ponderosa Pines pool could also be purchased. This would allow that pool to be extended upstream 300 feet, and might provide deeded access to the river for maintaining the pools.
6. To increase the capacity of both DWR pools without increasing the surface area, the pools could be deepened. This might be accomplished during pool maintenance by diverting GVC flows around the west side of the pools and

through culverts at the outlets. Then after dewatering the sites with pumps, conventional construction equipment could be used to remove new sediment down to the pool bottom. After excavation, tractors with rippers could loosen the cemented gravel bottom material for removal. Well driller logs in the immediate area indicate this cemented gravel may be 50 to 80 feet deep.

7. In order to cover designated wetlands with fill, additional wetland areas must be developed. Areas where this might be accomplished are as follows:
 - a. West of Lewiston Road, the existing emergent marsh could be enlarged by excavating areas on the terrace near the creek. Since the summertime source of water is from irrigation overflow from the adjoining property south of Lewiston Road, this area receives a good supply of water.
 - b. West of GVC, water from the Wellock diversion ditch could be used to expand wetlands in this area. An agreement with the water diverter and adjoining property owners would be necessary to define how much water could be made available. Responsibility for maintaining the point of diversion would also be necessary.
 - c. Gravel from the old dredger tailing area could be removed and processed to supply spawning gravel to the river. The resulting excavations could be partially backfilled with fine material from the screening operations to near the existing dredger pond bottom elevations. Wetland vegetation could then be planted in this area. Existing wetlands in this area would be avoided during excavation activities.

CHAPTER 2

INTRODUCTION

In 1963, the federal government began storing water in the Trinity River Division of the Central Valley Project (see Figure 1). This project was designed to supply irrigation water to the Central Valley of California, and to generate electrical power.

During the next 10 years, the number of salmon and steelhead trout returning to the river declined. In response to the fishery losses, several committees were established to study the problem. In 1974, the Trinity River Basin Fish and Wildlife Task Force was organized to define and solve the problems in the Trinity watershed caused by the Trinity Project. The Task Force grew until it eventually included representatives from 13 State, federal, and local agencies.

The Task Force found the river had become heavily sedimentated with decomposed granite sand. This DG sand filled fish resting pools, caused spawning riffles to become cemented, and covered fish food organisms. Grass Valley Creek was identified as being the major contributor of DG to the Trinity River.

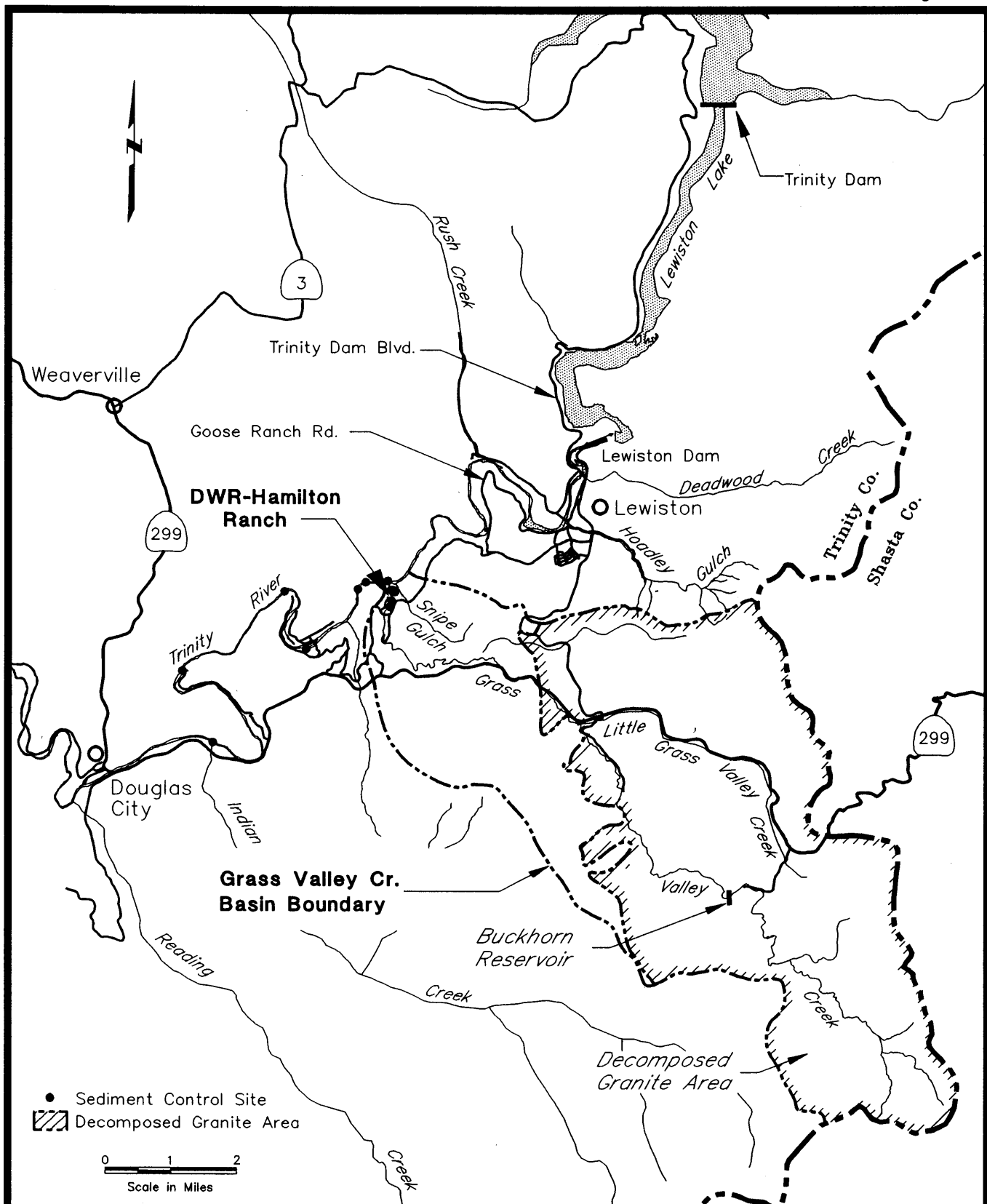
In addition, reduction in flood volumes allowed riparian vegetation to become established on the formerly bare river banks. The root mass from this vegetation prevented movement of the underlying gravels, resulting in vertical streambanks instead of the gently sloping gravel bars containing voids used as habitat by young fish.

In 1976, DWR was requested by the Task Force to identify and develop alternatives to control the sediment load originating in the GVC watershed. After investigation, DWR recommended a sediment control project (authorized and funded through Public Law 96-335) to include construction of a debris dam, and design, construction, operation, and maintenance of a sand dredging system near the mouth. The sand dredging system includes sediment control pools in both GVC and the Trinity River.

The Task Force published the "Trinity River Basin Fish and Wildlife Management Program" in 1982. This management plan included control of sediment from Grass Valley Creek as a major objective of the program. The Buckhorn Mountain Debris Dam, restoration of the GVC watershed, and the sediment control system were the alternatives chosen (see Figure 2).

Construction of Buckhorn Mountain Debris Dam was completed by the U.S. Bureau of Reclamation in October 1990. Watershed restoration work has begun on a limited scale, and in 1993, 17,000 acres of timberlands in the watershed were purchased to protect them from the effects of future logging.

Figure 2



California Department of Water Resources, Northern District
 Location of Grass Valley Creek
 Sediment Control Sites

DWR, under agreement with DFG and USBR, purchased Hamilton Ranch in 1985 and constructed two sediment trap pools in GVC. DWR has also constructed two pools on private property at the mouth of GVC, constructed or enlarged two pools in the Trinity one-half mile downstream, and dredged sediment from a natural pool at Poker Bar, 2 miles downstream from GVC.

In 1991, USBR constructed a new pool and cleaned out the natural pool at Poker Bar to increase the sediment capacity of the system.

Although DWR and USBR have constructed or maintained other sediment control pools upstream of GVC, this report deals mainly with activities on the State-owned DWR-Hamilton Ranch. The sediment control work downstream from GVC is discussed more fully in Chapter 5.



Grass Valley Creek watershed restoration work on a logging road near Buckhorn Dam, upstream of the DWR-Hamilton Ranch sediment control facilities.

CHAPTER 3

CHRONOLOGY OF ACTIVITIES AT DWR-HAMILTON RANCH

Background

The pool and disposal area on DWR-Hamilton Ranch is the largest sediment-control project constructed by DWR in the Trinity River basin. The project required purchase of approximately 90 acres of the Old Lowden or Hamilton Ranch. This property was bought in December 1985 for DWR's appraised value of \$273,400. A combination of State and federal funds was used.

DWR-Hamilton Ranch is located in Trinity County southwest of Lewiston, California (see Figure 1). The site is adjacent to GVC near its confluence with Trinity River. It is bordered by Trinity River on the north, GVC and residential parcels on the west, and pastures and forested areas to the east and south. Figure 3 shows features of DWR-Hamilton Ranch.

History

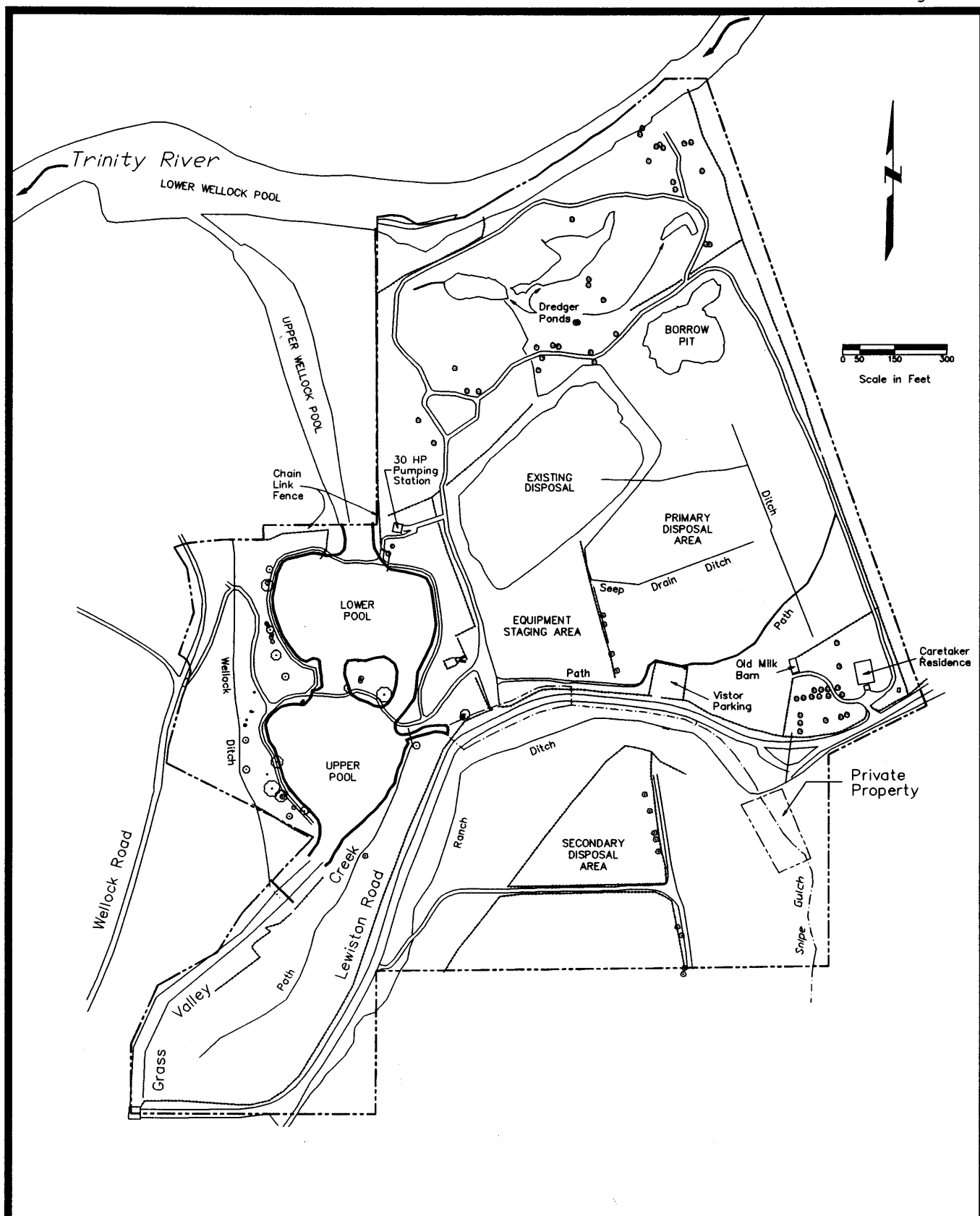
DWR-Hamilton Ranch was formerly a portion of the Lowden Ranch and has a rich historical background. The old Lowden Toll Road followed the eastern DWR property boundary down to a crossing on the Trinity River. Portions of the northern end of the site have been used for gold dredging activities, while the bulk of the site has been used predominately for livestock grazing and farming.

This is indicated by the following assets of the Lowden Ranch as shown by the 1858 Trinity County Assessor's inventory: the following acres of ...barley (75), oats (5), corn (2), potatoes (32), turnips and beets (4), onions (2.5), timothy (7), melons and pumpkins (5), cabbage (3), strawberries (.5); and the following numbers of food producing trees, shrubs or vines... apples (1,500), peaches (1,000), pears (15), plums (300), cherries (40), currants (200) and grapes (200) (Trinity Journal dated August 7, 1958).

A survey of archaeologically sensitive features was completed in March 1986 and there are several resources on DWR-Hamilton Ranch that have potential for archeological or historical significance. These include a possible Native American site above Lewiston Road, sections of riveted iron pipe and split retaining posts along the east side of the property, and an early twentieth century milking parlor and separator.

The reviewing archeologist's recommendation was to avoid impacting these historical resources during soil disposal or other construction activities as these features are worthy of preservation and should be maintained.

Figure 3



California Department of Water Resources, Northern District
Features of the DWR-Hamilton Ranch

Recent Activities

Within the site there are several areas that are the main focus of this management plan: the sediment control pools; the primary sediment disposal sites located on a formerly irrigated pasture north of Lewiston Road; the secondary disposal area on the terrace south of Lewiston Road; the old dredger tailing and dredger ponds area; wetlands along Lewiston Road and within the primary disposal area.

Sediment control pool sites are anticipated to cover about 8 acres. The disposal areas will cover approximately 22 acres while some 60 acres will remain undisturbed.

The first sediment disposal on the property occurred in 1986. This was about 30,000 yd³ excavated from the pools on private land at the mouth of GVC.

In addition, a 30-HP electric pump was installed in a shallow well near GVC to supply water for a sprinkler irrigation system. The irrigation system was intended to help establish vegetation on the disposal areas. A diagram of the well and pump design and an inventory of the sprinkler system are included in Appendix B.

Ranch Ditch, which is the historical name for the main irrigation diversion ditch, runs along the hillside above Lewiston Road. Leakage and washouts have increased maintenance costs for this ditch. Over a period of several years, DWR has placed a 15-inch-diameter corrugated PVC pipe in most of this section of the ditch. Additional pipe was installed in portions of the ditch on the Coffin property, located south of the DWR property, to solve leakage problems there.

During 1987, a roadside parking area was constructed. This was done to reduce the accident potential created by visitors who previously parked on the road near a blind curve.

Also in 1987, a water treatment system was installed at the caretaker's residence. A chlorine feed pump, injection valve, automatic back-flush filter and timer, and 210-gallon contact tank was used to reduce odor, taste, and staining problems.

In 1988, the upper DWR pool was constructed. About 33,000 yd³ was excavated and deposited in the primary disposal area. Existing topsoil was first stockpiled, then placed over the top of the spoil.

The lower DWR pool was constructed in 1989 by removing 58,600 yd³ from GVC. Again, the spoil was placed on the primary disposal site and covered with topsoil removed from the site. During this project, about 4,000 yd³ of sand that had entered the upper pool

was removed. About 3,000 yd³ of this was stored separately in order to make it available for use elsewhere.

Some rocky material from the sediment control pool evacuations was stockpiled north of the sediment storage area. This material will be used for haul-road surfacing and erosion control, where appropriate.

Revegetation work was performed after the pools were constructed. Bare areas were planted with a grass seed mixture and wood fiber mulch applied by a hydroseeding truck. During construction of the lower pool, a California Department of Forestry conservation crew transplanted reeds and rushes from drain ditches to the edge of the upper pool. The work was supervised by staff from the Redwood Community Action Agency.

In February 1990, the RCAA and CDF crews planted 600 cottonwood and willow cuttings and 1,200 seedling trees on the disposal areas, pool banks and upland areas to compensate for vegetation removed during pool construction.

Annual reports on the DWR sediment removal projects were prepared after each project was completed. These are available from the DWR Northern District office in Red Bluff. The reports include project costs and the quantities excavated.

No contracted construction work or restoration activities have been conducted by DWR since February 1990. However, in 1992, Trinity County contracted for a suction dredge, shown below, to remove about 5,000 yd³ of sediment from the upper DWR pool. Sediment was pumped into a settling pit in the north-east section of the primary disposal area.



CHAPTER 4

TOPOGRAPHICAL FEATURES OF DWR-HAMILTON RANCH

General Vicinity Description

The DWR-Hamilton Ranch is situated on two gently sloping terraces. Grass Valley Creek flows along the western edge of the site and the Trinity River forms the northern boundary (see Figure 3 on page 12 and Figure C-1 on page 91).

The elevation of GVC at Trinity River is 1,735 feet and at Lewiston Road Bridge is 1,780 feet. The highest elevation at the site is 1,886 feet on the upper terrace south of Lewiston Road.

North of Lewiston Road, the property is virtually flat and gently slopes towards the Trinity River. The terrain contains open grass lands, wetlands, wooded upland areas, old dredger tailings, ponds, and riparian areas.

South of Lewiston Road the terrain is an elevated terrace vegetated by grass and surrounding trees and brush. The area slopes gently to the north, and at its northern edge slopes abruptly down to Lewiston Road.

The north property line is approximately the center of the Trinity River. The north end of the site is dominated by leveled dredger tailings from gold mining operations, dredger ponds, mature riparian forests, and mixed woodland-grasslands. Throughout the rest of this report, this material will be referred to as old gravels. These old gravels are deposited in piles 10 to 20 feet high in the area around the ponds. Along the river, those piles have been flattened to provide vehicle access.

In 1977, USBR built a spawning riffle in the Trinity River at the northwest corner of the Hamilton property. This was called Riffle I. Berms of large rocks were constructed near both banks to narrow the channel to a predetermined width. The riffle was completed by placing graded spawning gravel in the site. The river channel south of the berm became a backwater pond and marsh.

Although some spawning occurred on Riffle I, the project was not considered successful, probably because a steep gradient caused fast water velocities on the riffle.

Floods after 1977 have washed away the original spawning gravel and new gravel placed on the riffle by DWR. In addition, the backwater pool was partially filled with sediment in 1982. The tops of steel fence posts can still be found that were buried by sand. In 1986, sediment control pool construction downstream contributed to increasing the river gradient between the rock berms.

Between GVC and Lewiston Road is a marsh that receives surface and subsurface flows from the hill slope above, and in the summer overflow water from flood irrigated pasture to the south.

Two sediment control pools are located in GVC. These are discussed more fully in Chapter 5. Appendix F describes how they were constructed.

The primary disposal site is just east of the pools on the nearby old pasture site. The secondary disposal site, which has not been used yet, is on the high terrace to the south and east of Lewiston Road.

Near the center of the primary disposal area is a low wet area with poor drainage referred to as the sedge-rush seep. Historical evidence suggests that Snipe Gulch once drained down through the seep on its way to the Trinity River. Much of the topography in this area was modified during past agricultural activities.

Materials excavated from the sediment pool in 1988 and 1989 were placed on the northwest portion of the primary disposal site. The spoils form a terrace 10-15 feet high with gently sloping side slopes at about 5:1. Approximately 2 feet of top soil was removed from the sediment disposal areas, stockpiled, and placed on top of the deposited sediment to provide a growing medium for area revegetation.

To the south and east of Lewiston Road are two irrigation diversion ditches. The only active ditch is the Ranch Ditch, which is on the steep sidehill slope next to the road. Remnants of the second diversion still exist on the upper terrace area, above Ranch Ditch. A third diversion ditch is located on the land west of GVC and is used to irrigate pasture on the Wellock property.

Soils

Historical photo analysis of DWR-Hamilton Ranch shows that the Trinity River flooded much of the pasture areas north of Lewiston Road. This flooding history helps account for the deep deposits of silty loam soil covering much of this area. Snipe Gulch has also deposited soil on the pasture area. GVC has contributed deep deposits of gravel and cobble. Above this are thick deposits of sandy soil.

Soils from the sediment control pool evacuations are all fairly consistent and mostly composed of DG sand. The soil on the banks of the sediment control pools is composed predominately of extremely gravelly loamy sand. These soils were disturbed during construction of the pool, and some areas have rock rubble placed on the banks for erosion control. Soil types are xerofluvents-riverwash complex which are well-drained soils

formed in alluvium from bedrocks. Available water capacity is very low with erosion hazards ranging from slight to moderate.

Not all of the material excavated from pool construction is DG. About one-third is gravel and rocks found in deeper layers. The deepest material contains cobble and large boulders. The pool bottom consists of very hard layers of cemented sand and small gravel. No bedrock outcrops were found in the pool areas.

Existing soil types around the pools should be adequate to allow successful establishment of planted and naturally invasive riparian species, given the close proximity to the water table. Competition for water from undesirable plants should be kept to a minimum during the establishment phase.

A minimum of 2 feet of topsoil should be removed from the sediment disposal site and then placed on top of the fill to aid in revegetation of this area. Placement should be monitored carefully during construction to assure complete coverage. These soils are Haploxerolls, a fine sandy loam which is deep, well drained, and has rapid permeability.

Soils in the wet areas of the lower pasture will support riparian and other wetland species.

The secondary disposal site on the upper terrace area south of Lewiston Road has a clay loam soil type called Hotaw loam, which is a moderately deep, well-drained soil. Available water capacity is moderate, and erosion hazards are severe.

Soils on the steep hillside south of Lewiston Road are very erosive, and any disturbance of the slope area should only be done with adequate measures to control drainage and erosion.

Soils in the old dredger tailing areas are composed mostly of extremely gravelly loamy sand and dredger tailings. This soil is very deep and excessively drained. It was formed in alluvium and outwash from mixed rocks of hydraulic mining. The tailings consist of nearly barren mounds of coarse alluvial material 5 to 30 feet high that were deposited by mining operations.

Climate

DWR-Hamilton Ranch has hot summers and mild but pronounced winters. Summer temperatures can reach over 100 degrees F. Typical winter low temperatures range from 23 degrees to 9 degrees F. While Hamilton Ranch is located in a deep river valley bottom, it still receives much sunlight, even in the winter. This is because the GVC watershed opens to the south through a break in the mountains allowing significant sunlight exposure year round. Morning sun in the fall and winter is somewhat limited due to mountainous terrain southeast of the site and because ground fog occurs quite often in these months,

although it usually burns off by noon. This limits total hours of sunlight.

Precipitation averages 30 to 40 inches per year with the majority of the rainfall coming during the months of October through April.

Hydrology

The principal hydrologic factors affecting the DWR-Hamilton Ranch project site include GVC, Trinity River, Snipe Gulch, upslope runoff, two diversion and ditch systems from GVC, direct precipitation, runoff from adjoining parcel irrigation, and ground water.

GVC flows for 1,800 feet along the western edge of the property. It flows through two sediment control pools on State land and discharges into another pool on private land at the mouth.

The pools are designed for maximum sediment-trap capacity. This means that they are constructed as deep, long, and wide as possible given property boundary and bottom material constraints. Because of the relatively steep gradient of the creek, it was not possible to construct a single long pool and still have ponded water to trap moving sediment during low flows.

The Trinity River flows along the northern edge of the site. Because Trinity and Lewiston Dams now control floodflows, the land is no longer flooded as often as it was prior to dam construction.

The Flood Insurance Rate Map, published by the Federal Emergency Management Agency, Number 06105C0540B, shows that flooding could affect some of the project site north of Lewiston Road. Flood depths are indicated as relatively shallow (1 foot or less) and the configuration of the river valley is such that this area acts as an overflow basin allowing large quantities of silt to be deposited on these pastures.

Historical evidence suggests that Snipe Gulch used to flow out through the middle of the pastures and down to the river. Currently, it flows out of the hills south of Lewiston Road, enters a roadside ditch making a 90-degree bend to the west, and follows Lewiston Road for several hundred feet before making another 90-degree turn under the road through two culverts: one is 2 feet in diameter, the other is 4 feet. The small culvert discharges into a ditch that runs along the north side of the county road. This ditch is used for distributing irrigation water to the nearby pasture and directing minor runoff away from the construction staging area.

Water formerly flowed northward from the larger culvert in a shallow swale and dumped into GVC. Currently, flows from this culvert are directed by a ditch to the upper sediment pool.

During future floodflows, sediment from Snipe Gulch will fill the ditch, and water will sheet-flow across the haul road to the lower sediment pool.

Numerous seeps emerge from the hill slope south of Lewiston Road and flow into the roadside ditch. These seeps are most evident during the summer when irrigation water is in the Ranch Ditch.

One seep area is located on the hillside above the diversion ditch, east of the secondary disposal area access road. This is usually dry in summer, but supports enough vegetation that the USCE has determined it is under their wetland jurisdiction.



Snipe Gulch flows through the privately owned property south of Lewiston Road. Between the sections of fences is a corrugated 15" plastic pipeline that conveys water in the Ranch Ditch across Snipe Gulch.

Several ditches in the central area of the primary disposal area historically were used to irrigate and/or drain a large area of the old Hamilton Ranch pastures. The water supply for these ditches came from Ranch Ditch, a gravity water diversion that originates upstream in GVC and to a much lesser extent from Snipe Gulch.

A diversion ditch flows north along the bluff on the western edge of the ranch. This diversion is used to irrigate the Wellock family pastures near the river. When the ditch is not maintained, leakage floods portions of the flat between the bluff and the lower pool. In the past, the ditch user has used a backhoe to remove sediment from the ditch. DWR has used CDF convict crews to clear vegetation so the ditch can be inspected. The ditch presently needs to have vegetation removed, be deepened, and have leaks repaired.

At the time of purchase of this property by the State, the gravity water diversion system was leaking, causing uncontrolled flows of water to reach the old irrigated pasture area. DWR staff believe this irrigation water led to the enlargement of a wetland in the primary disposal area. To determine the nature and extent of this wetland area, the Natural Resources Conservation Service has installed 13 piezometers to determine water table levels. This information is being checked for both irrigated and nonirrigated conditions. Vegetation types in this area have also been mapped. The contour map in Appendix C indicates where these are. Appendix G contains a record of the piezometer measurements.

Several interconnected ponds are located at the north end of the site. These are remnants from past gold dredging activities.

Precipitation and ground water appear to be responsible for maintaining water levels in the ponds. A small outlet from the ponds leads to a small backwater marsh along the river. Surface water could enter the ponds from Snipe Gulch if the gulch overtopped the road ditch. Drainage from the pasture area and from the adjoining property to the east flows into the ponds during wet winters.

Flows on the Trinity River are generally maintained at 300 to 500 cfs by releases from Lewiston Reservoir. During wet periods, flows often reach 3,000 cfs or more as a result of tributary runoff. Floodflows over 14,000 cfs have occurred at Lewiston gage since the dams were constructed. (In contrast, the historic peak flow at Lewiston was 71,600 cfs in 1955.)

In recent years, and into the future, Trinity River flows will be higher during the spring months in order to increase habitat for rearing salmon. It is likely that flows ranging from 1,500 to 3,000 cfs will be maintained for prolonged periods during the spring months. Lewiston Dam releases as high as 8,500 cfs in the late spring are also a possibility in the future for sediment flushing and smolt migration. In 1992, 6,000 cfs was released from Lewiston Dam in the early part of June for those purposes.

A U.S. Geological Service stream gaging and sediment monitoring station, Grass Valley Creek at Fawn Lodge, near Lewiston, California, has been in operation since 1975. Low flows average around 20 cfs although flows over 4,100 cfs have been recorded.

Water Rights Issues

Hamilton Ranch, being adjacent to Trinity River, Grass Valley Creek, and Snipe Gulch, has riparian rights to their waters for beneficial use. In addition, the State has one-half interest in two appropriative water rights to GVC, established prior to 1914. Courts have ruled pre-1914 appropriative rights can be lost by abandonment or five years of nonuse, but only if action is initiated by a second party.

DWR acquired a one-half interest in two ditches, and the water therein by rights of succession, when the Hamilton Property was purchased in 1985. This interest is a property right and allows DWR to maintain the diversion and the ditch in their original location. The deed that created this interest did not require any frequency-of-use or maintenance to keep it in effect, so rights to the ditches cannot be lost by nonuse.

One ditch called the Ranch or Lowden Ditch runs along the south side of Lewiston Road from a diversion point near the mouth of the GVC canyon. The appropriative water right is for 120 inches of water measured under a 4-inch pressure (about 3 cfs).

A second ditch once began at a diversion further upstream. Water flowed through several flumes high on the canyon side to the upper terrace south of Lewiston Road. These flumes, according to Mrs. Hamilton, are either in unusable condition or were salvaged for the timbers. The diversion has not been used for more than five years, so the appropriative right will probably be lost if contested by another party. However, a riparian right still exists by virtue of the upper terrace being part of a parcel abutting GVC. The diversion probably could be installed again based on the one-half ownership of the ditch. However, reinstalling the flumes and repairing the ditch would be expensive.

Appendix E includes a letter requesting information about DWR rights to use Ranch Ditch. The response from DWR's Office of the Chief Counsel is also included. Excerpts from DWR Bulletin 94-2, "Land and Water Use in Trinity River Hydrologic Unit," show historic water use beginning about 1852.

Water Use at DWR-Hamilton Ranch

State law requires surface water users to file a "Statement of Water Diversion and Use" with the State Water Resources Control Board every three years. DWR has reported surface water use from Snipe Gulch and Grass Valley Creek for 1986 through 1989 and 1990 through 1992. A copy of the 1992 report is included in Appendix E.

DWR last activated the Ranch Ditch Diversion in 1993. However, Grass Valley Creek water from the Coffin Diversion has been used each year to irrigate the residence orchard area and to maintain wetlands near Lewiston Road. In 1988, the Ranch Ditch diversion was activated by Mr. Roger Aldrin of Weaverville, who irrigated pasture east of the DWR property. DWR used some of this diverted water to irrigate the orchard and the wetland areas, thus exercising the appropriated right.

Since then, the orchard has been irrigated by using water conveyed through the Knowlden (formerly Al Mills) and Coffin Diversion. The ditch on the Coffin property has an intertie near Lewiston Road that can transport water into the lower part of the Ranch Ditch. Since the source was not at the appropriated diversion location, the riparian water right was used.

The wetland along Lewiston Road is presently irrigated in summer by overflow from the Coffin pastures flowing under Lewiston Road and percolating up into the wetlands. It is probable that old animal burrow holes contribute to this flow.

It is possible for DWR to lose the appropriated water rights by nonuse. However, DWR can exercise its riparian rights at any time. Since DWR has a deeded one-half interest in the Ranch Ditch, this provides a means of diverting water from upstream. The other owner of the one-half interest is not riparian to GVC, and may lose the right to use water under the pre-1914 appropriation. The owner can still file a new application with the State Water Resources Control Board.

In order to exercise the appropriative water right, DWR will install the Ranch Ditch diversion in 1993. DWR will continue to file reports of water usage with the SWRCB.

Social Description

The Lewiston area was formerly noted for its access to mining and logging activities. As these industries have been reduced over the decades, recreation and residential use has become more prominent.

The Lewiston area has been increasing in population in the last few years as more land is developed for home sites. Many residents have moved from high-cost metropolitan areas upon retirement, and others commute to the Redding basin for employment. This trend is expected to continue, especially as portions of Highway 299 east of Buckhorn Summit are improved.

Many of the current residents seem to oppose any increase in population or development. This was evidenced by opposition to a State-federal proposal to purchase the adjoining 200 acres for extension of the sediment control project. A current local controversy relates to the proposed development of the same land for a golf course and residential subdivision.

If new homes are built nearby, we can expect more objection to sediment control activities that require use of noisy, heavy equipment and creation of dust from equipment movement.

We can also expect to encounter more people who object to government activities in general, and who will not cooperate in allowing sediment control work to be done on their property. Examples of these are the property owners of the pools at the mouth of GVC, the proposed upstream extension of the Ponderosa Pines pool, and the downstream extension of the Stott hole. For this reason, purchase of key sediment control and disposal sites by the Task Force is recommended.

CHAPTER 5

THE GRASS VALLEY CREEK SEDIMENT CONTROL SYSTEM

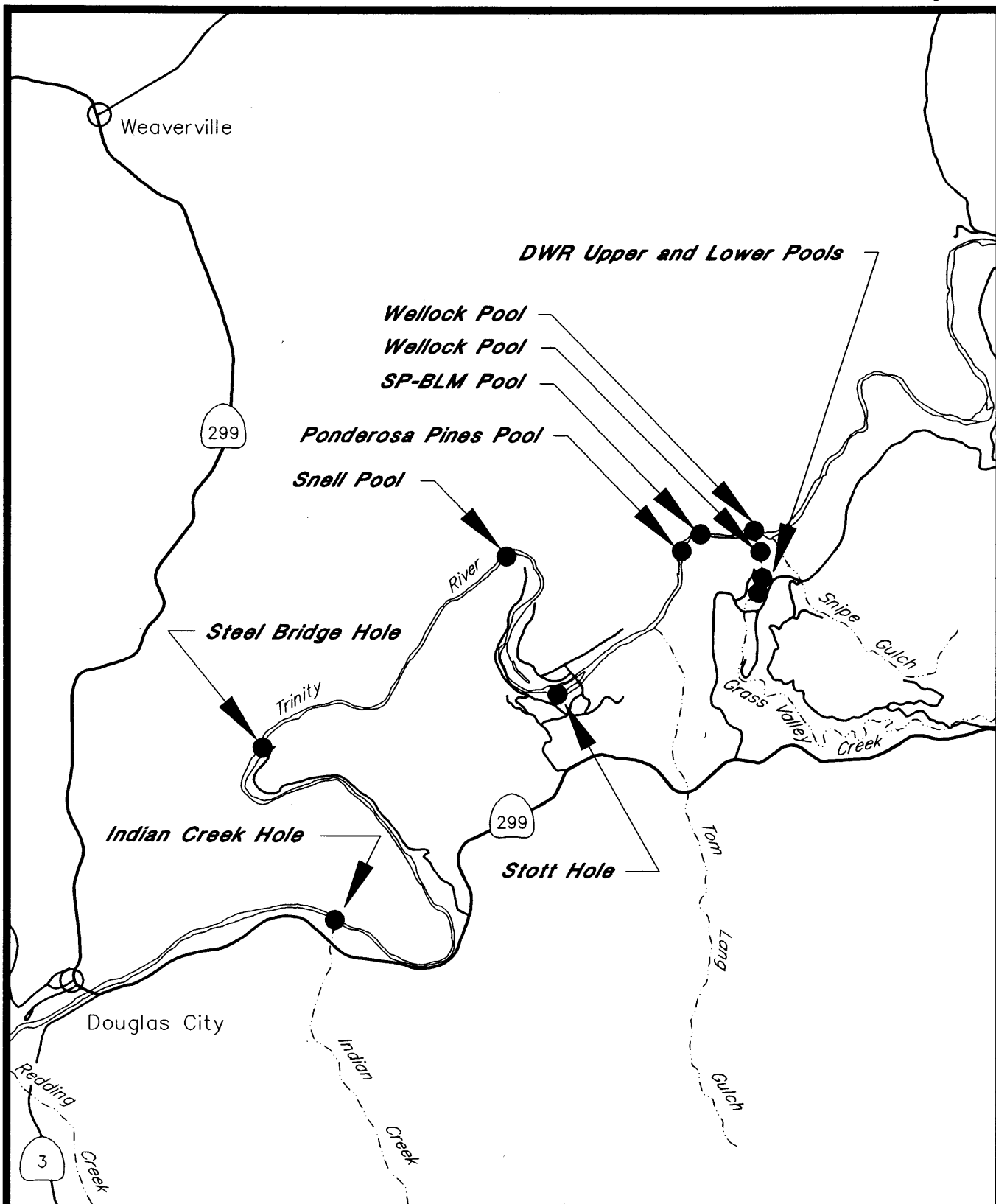
The pools at the mouth of GVC and downstream in Trinity River are one part of a three-phase system to control sediment generated in the GVC watershed.

The major feature is the Buckhorn Mountain Debris Dam on upper GVC. This dam, located 10 miles upstream from the mouth, will collect an estimated 30 percent of the decomposed granite sand moving down GVC. The second phase is watershed restoration work. Successful restoration above the dam will extend the effective life of the reservoir. Work downstream will reduce quantities that will flow toward the Trinity River.

Sediment produced below the dam after watershed restoration will be trapped in the third phase of the system, sediment control pools near the mouth of GVC and downstream in the Trinity River. The pools will be excavated when they fill with sediment. The dam, watershed restoration, and the sediment control pools work together as a sediment control "system". Figure 4 shows the location of the sediment control pools.



Lake at Buckhorn Mountain Debris Dam. The bare areas are granite formations.



California Department of Water Resources, Northern District
Sediment Control Pools in
Grass Valley Creek and Trinity River

Construction Costs and Capacity of the Sediment Control Pools

Table 1 provides information about the sediment control pool construction. Unit costs for both the construction contractor and the total project are shown. The total cost includes design, inspection, right of way, permits, environmental documents, contract administration, and access road repair costs. The public parking area and pump irrigation system are not included, as footnoted.

The last column lists the estimated filling capacity of each pool, determined by estimating the way sediment might be deposited in the pools. For pools in GVC, the downstream outlet elevation was considered the maximum elevation of fill. The sediment was assumed to increase in elevation upstream until it reached the elevation of the inlet. During flooding, pools may experience irregular filling, leaving holes in some areas and building bars above the assumed level in others.

In the event of very severe flooding, sediment deposition could approach the elevation of the original banks. In that case, the original excavation volume might be closer to the capacity. Table 1 does not reflect this situation.

Capacity of pools in the river was estimated from the volume excavated during construction. If during flooding, enough sediment is deposited to raise the river bottom in the runs upstream and downstream from the pools, the capacity will be greater.

Figure 5 illustrates how a creek or river pool might fill with sediment.

Sediment Control Pools on the DWR-Hamilton Property

GVC flows through two sediment control pools on State land. The construction of the pools are similar, although the overall shapes are different. Figure 6 shows a profile of the upper and lower pools.

Water in these pools averaged about 6 to 10 feet deep immediately after construction. The spillway outlets are armored with large boulders to reduce erosion. The pools are surrounded by berms that will be left clear for maintenance access. Grasses were planted on the side slopes and berms to reduce erosion.

The upper DWR pool begins near adjacent upstream privately owned property. The excavation area is about 400 feet long and 400 feet wide, and is roughly circular in shape.

The lower DWR pool is located between the upper pool and the private property to the north. Due to the small area available, this excavation is wider than it is long, about 500 feet by 250 feet. A second entrance from the upper pool was constructed

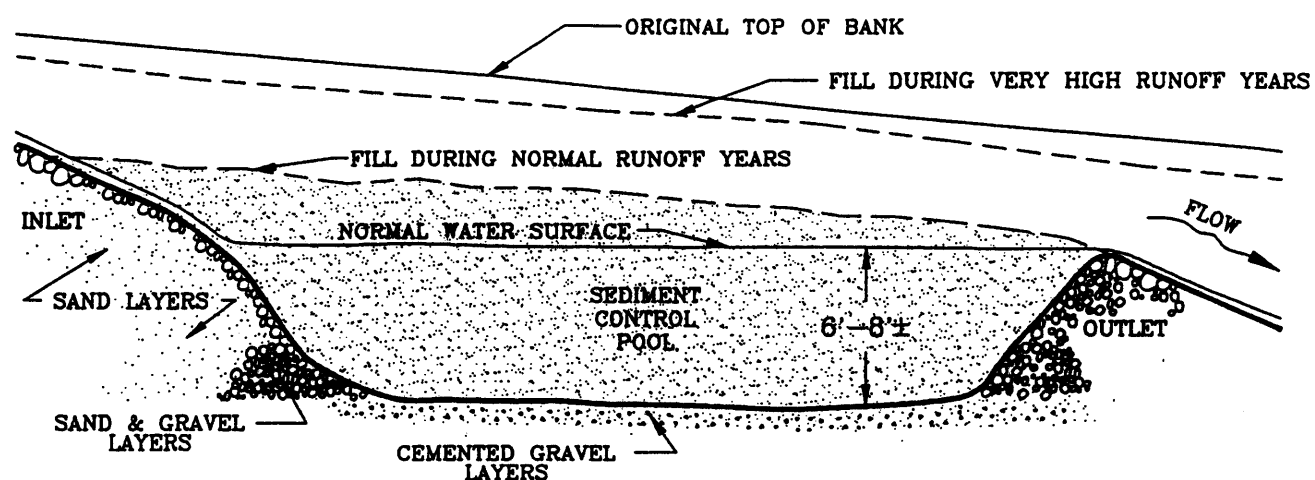
TABLE 1
SEDIMENT REMOVAL COSTS AND POOL CAPACITY

Year	Project/Agency	Quantity Excavated (yd ³)	Unit Rate (yd ³ /hr)	Contractor Cost (\$)	Contractor Unit Cost (\$/yd ³)	Total Cost (\$)	Total Unit Cost (\$/yd ³)	Estimated Storage Capacity (yd ³)
1979	Stott Pool/DWR	6,300	21	N/A	N/A	72	11.54	
1983	Southern Pacific Pool/DWR	15,000	39	96,630	6.44	163,520	10.90	
1984	Wellock Pools/DWR	60,800	143	225,547	3.71	296,000	4.88	
1985	Southern Pacific Pool/DWR	9,700	81	56,600	5.83	84,000	8.65	
1986	Wellock Pools/DWR	30,500	95	182,400 ^{1/}	5.98	281,500 ^{1/}	9.23	50,000
1987	S-P Pool Ponderosa Pines Pool/DWR	7,000 7,200	69	77,500 ^{2/}	5.46	159,600 ^{2/}	11.23	22,200
1988	DWR Upper Pool/DWR	33,000	80	244,800	7.39	351,800	10.66	18,000 (upper only)
1989	DWR Upper Pool DWR Lower Pool/ DWR	4,300 54,600	94	424,500	7.24	615,500	10.50	35,000 (lower only)
1990	Lower Poker Bar Pool/USBR	10,777	N/A	119,145	11.05	N/A	N/A	10,800
1991	Stott Pool/USBR Poker Bar Pool/ USBR	4,100 8,800 ^{3/}	N/A	103,000	7.98	N/A	N/A	6,300 8,800
1992	DWR Upper Pool/ TC	3,350	N/A	34,480	10.30	43,100	12.87	
1993	DWR Upper Pool/ TC	3,080	N/A	16,158	5.25	20,200	6.56	
							TOTAL	151,100

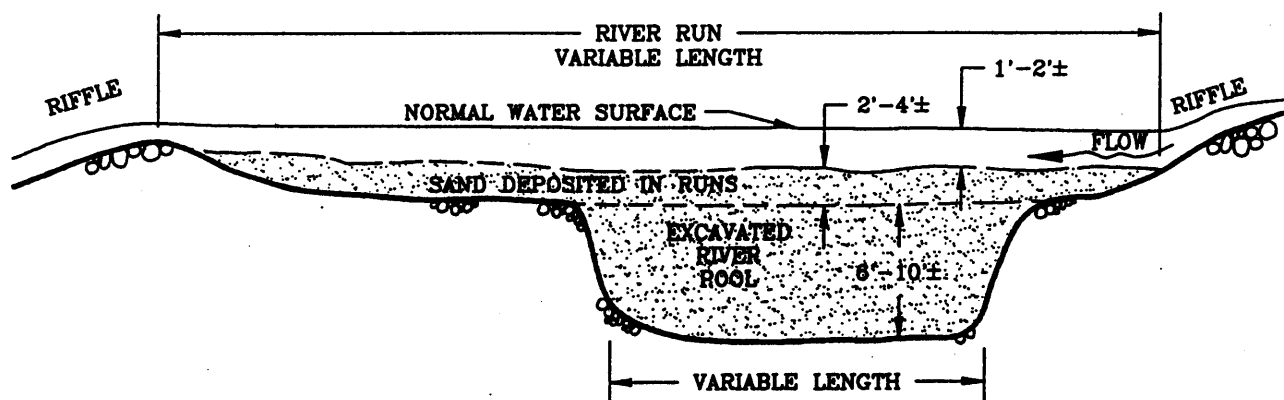
1/ Cost does not include installation of irrigation system at DWR Hamilton Ranch.

2/ Cost does not include construction of parking access at the DWR Hamilton Ranch.

3/ Includes 1,200 yd³ of screened rock that was returned to the channel.



GRASS VALLEY CREEK POOLS



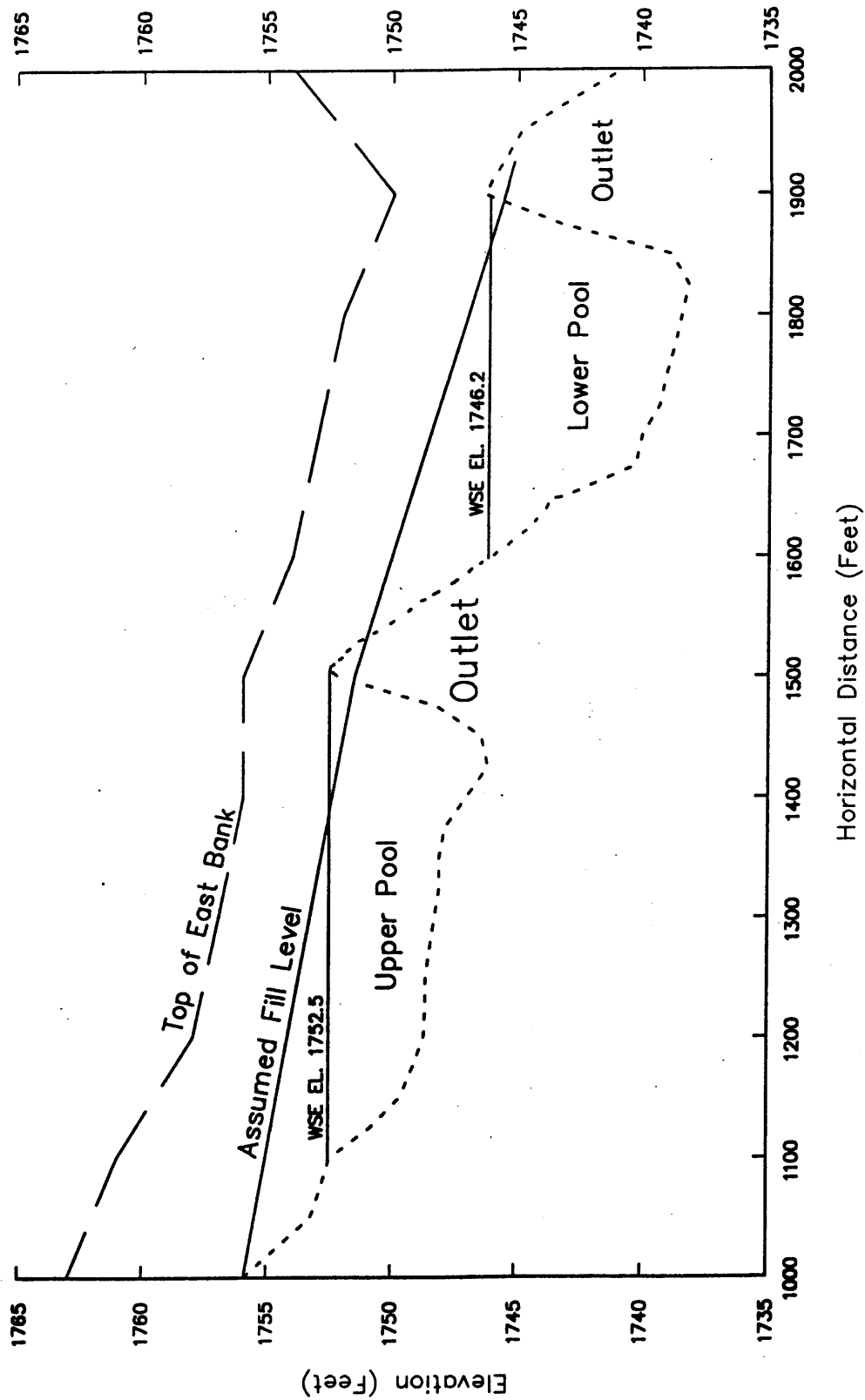
RIVER RUN POOLS

California Department of Water Resources, Northern District

DWR-Hamilton Ranch

Potential Fill In of Sediment Control Pools

Figure 6



California Department of Water Resources, Northern District
 Profile of Upper and Lower Pools

to help provide more even filling. This spillway crest is at about the same elevation as the main outlet from the upper pool, but does not have a low-flow channel for fish passage.

The banks on the east side of the DWR pools are at existing ground level. The banks on the west side are about 4 feet higher than those on the east. This was intended to divert floodflows away from private property to the north.

The bank side slopes are about 4:1. Pool side slopes have some rock boulder armoring in place around the inlet and outlet areas. Material from the pool bottom containing gravel and cobble was placed on the slopes to help resist eroding of the sandy material during high flood flow events.

Sediment was removed from the upper pool using a hydraulic excavator in 1989, and a experimental suction dredge in 1992. As of Spring 1993, new sediment deposits in the upper pool appeared to be filling toward both outlets, spreading out across the width of the pool as expected. Most of this sediment was removed by suction dredge in summer 1993.

Pools at the Mouth of Grass Valley Creek

Two sediment control pools were constructed in 1984 on the Wellock property at the mouth of GVC (See Figure 4). One is located in the creek and the other in Trinity River. Both filled with sediment in 1986 and were excavated again.

The creek pool is about 800 feet long and 125 feet wide. The pool banks are at about 1:1 slope. This was done at one of the property owner's wishes to limit the extent of the construction area. There is no rock facing on the banks.

The outlet is a low berm, faced with large rock. A low-flow channel in the middle of the spillway provides access for fish passage.

In 1986, runoff from GVC filled this pool with sediment in several days. Peak flow measured at the Fawn Lodge gage was 2,500 cfs. (The maximum flow of record was 4,670 cfs on February 28, 1983.) Banks at both sides were eroded as deposited sediment caused the current to flow towards the sandy banks. The pool was restored during summer 1986.

The Trinity River pool at the mouth of GVC was also constructed in 1984. This pool was roughly triangular in shape. A gravel bar downstream on the south side of the river was cleared of deposited sand. An existing sand and gravel levee along the south bank was repaired and elevated to protect the pasture behind it. This pool also filled with DG, and more sediment was deposited on the bar downstream. During maintenance dredging in 1986, it was enlarged towards the north bank. The pool was extended upstream

to provide capacity for sediment that might flow from the DWR overflow area. This extension also restored a fish resting hole located just below the riffle above. A steep bank near the fish resting hole was sloped and bermed to reduce erosion during high water. New sand deposited on the gravel bar downstream was removed. The levee along the pasture was repaired.

Sediment removed from the 1984 pool construction project was used to fill several large depressions up to the surrounding grade on the pool site owners property. Some sediment was used to fill deep channels between old dredger tailings. Additional material was used to level a pasture area, eroded during the floods of 1983.

During the 1986 excavation, sediment from these pools was placed on the DWR-Hamilton Ranch primary disposal area.

The creek pool is presently partially filled with sediment. One of the property owners stated that he does not want additional sediment control work to be done here. When the pools fill again, they will become permanent storage for material that would otherwise have washed into the main channel if the pools were not constructed.

Southern Pacific Land Company-BLM Pool

The SP-BLM pool in the Trinity River 1/4 mile downstream from GVC was first constructed in 1977. A private contractor working for the USBR used a dragline to create a pool about 1/4 mile below GVC. About 9,000 yd³ of gravel was removed. The pool was approximately 80 feet wide and 300 feet long. Water depth was up to 10 feet during normal flows. Sediment was placed on nearby BLM and private land.

Since then, this pool has filled with sediment and has been cleaned out several times by DWR. An experimental suction dredge was used in 1978 to remove 4,500 yd³ of sand. Sediment was pumped into a diked settling basin. After draining, it was hauled to disposal sites on nearby private lands.

In 1983, a dragline was used to extend the pool upstream on BLM lands. About 15,000 yd³ of new sand and original river gravel was removed. Dimensions of the pool were about 60 feet wide by 560 feet long. Maximum water depth was about 12 feet.

Disposal was in a gravel borrow pit on BLM land. DFG previously used the borrow pit material to narrow the channel and build groins out into the river below the project site. The purpose of the groins was to improve spawning habitat in the area above the riffle, at the east end of Poker Bar.

During 1985, the SP pool was again excavated, this time using a hydraulic excavator (large backhoe). About 9,700 yd³ was removed. Pool dimensions were not changed. Sediment was placed over old gravel tailings on BLM property. An archeological study of the disposal site was prepared before work began. The report was used as a guide to avoid disturbing archaeologically sensitive sites.

The SP-BLM pool was last cleaned out in 1987. This work was done in conjunction with excavation of the Ponderosa Pines pool downstream. About 7,000 yd³ of sand was removed from the SP pool by a hydraulic excavator. This material was placed on both private and BLM property.

Ponderosa Pines Pool

Ponderosa Pines pool, constructed in 1987, is about 400 feet downstream from the SP-BLM pool. It is located on a single parcel of private property. It is about 80 by 300 feet and has water depths of 10 to 12 feet. About 7,200 yd³ were removed during construction. Disposal was on both private and BLM property.

River Access Through the Ponderosa Pines Subdivision

Access to both the SP-BLM and Ponderosa Pines pools are via a private subdivision road from Lewiston Road. Property lines extend to the center of the road, so permission to enter must be granted by all owners. BLM and Southern Pacific Land Company have no deeded access to the river here.

Repair of the access road has been the main concern of property owners in the subdivision. Repair work during past projects have included placing compacted shale on the road, patching holes and spraying dust-control oil.

At the river, there is one small parcel located just downstream from the SP-BLM pool called the "House of Mason" property. It is in joint ownership with 18 owners of the subdivision whose lots do not abut the river. To get to the access ramp at the lower end of the SP-BLM pool, equipment must cross the southeast corner of this parcel. Therefore, right of way must be secured from all the joint owners of this lot.

The SP land has been sold to an individual. The new owner contacted DWR about the possibility of developing sediment disposal sites on the land. The proposed site was high on the mountain side. This suggestion was considered impractical unless all other alternative sites are closed.

In order to insure that a future property owner does not decide to refuse permission to clean out the SP-BLM pool, the land surrounding the pool should be purchased. This is an issue that should be considered by the Task Force.

The Ponderosa Pines pool was planned to be about 600 feet long, beginning 300 feet further upstream, but the property owner for that section decided not to participate in the restoration work. The property has been offered for sale. Purchase of this land should be considered by the Task Force to increase sediment storage capacity below GVC. Purchase will probably establish a right to use the private subdivision road for access to the river.

Poker Bar Pool

Poker Bar pool was excavated by a USBR contractor using a hydraulic excavator in 1990. About 8,800 yd³ were removed. About 1,200 yd³ of spawning sized gravels were cleaned and placed back in the channel. Disposal of the remaining material was on several lots along the bar.

Stott Hole

Stott Hole is a natural pool, created by large rock outcroppings on the south bank. The pool was filled with DG sediment from GVC in the late 1960s.

DWR began experimenting here with a suction dredge in 1977. The last year the dredge operated (1979), DWR removed 6,300 yd³ of sediment. Material was pumped into a diked settling pond on the bar adjacent to the pool. After draining, it was hauled to several private parcels above the floodplain on Poker Bar.



DWR experimental suction dredge operating at Stott Hole on Poker Bar. Settlement pond is at the upper left.

USBR excavated 4,100 yd³ of sand from Stott Hole during 1991. A hydraulic excavator was used to load trucks with the material. Disposal was also on private sites at Poker Bar.

In order to create a more efficient sediment trap, DWR proposed extending the pool downstream 300 to 600 feet. The channel could be made wider to increase the capacity. Being located on several private parcels, permission to dredge this area is dependent on the good will of the owners. Present owners along the south bank may object to changing the bottom configuration in this area in a way that might affect their river frontage.

Equipment Access to Poker Bar

One problem in conducting work at Poker Bar is how to get heavy equipment across the Trinity River. The load capacity of one bridge on Quad P Road is unknown, but limited. Footings for this bridge were damaged during high flows. This damage was the subject of an attempted law suit over flood releases from Trinity Dam. Since then, DWR and USBR project managers have found alternative routes to get heavy equipment to Poker Bar.

The route used during the 1991 work was through the Cooksey property in the Ponderosa Pines subdivision. The excavator was hauled to the Cooksey site, unloaded, and driven across the river to Poker Bar. Then it was driven to the two dredging sites. The process was reversed when the work was done.

Another crossing site used in the past is near the end of Poker Bar Road. The river is quite wide and shallow in one location. Tracked equipment can cross easily. Low-hanging power lines across Poker Bar road may need to be raised when hauling equipment to this site.

Lower Poker Bar Pool

A sediment control pool was constructed in 1991 by USBR. This pool is located near the north end of Poker Bar Road on several private parcels. A hydraulic excavator removed over 10,000 cubic yards. The spoil was placed above the 100-year flood line on nearby private lands.

Snell Pool

In 1991, a suction dredge was set up in the river near the end of Poker Bar Road. This experiment removed only a few hundred cubic yards of sediment. Mr. Snell has repeatedly tried to get DWR to restore a fish resting pool in this area. This might be considered for a future sediment control project.

Steel Bridge Hole

This historic fishing hole 5-3/4 miles downstream from GVC is created by several rock outcrops. There have been many proposals to dredge it. Since the Trinity River canyon in this reach is not wide and Steel Bridge Road in some spots is very narrow, this is probably one of the most challenging potential sediment control pool locations. Finding places to dispose of material may be more difficult than at other sites.

River Between Steel Bridge Road and Indian Creek

DWR performed a cursory examination of a possible sediment control project in this area. A former Indian Creek Motel owner claimed that, historically, there was a long deep pool upstream from Indian Creek that was a great fishing hole before it filled with DG sand during the 1970s. Opportunity may exist to restore this pool as a feature of the sediment control system.

A terrace located on the north side of the river has potential for considerable sediment disposal. The property is owned by the Bureau of Land Management and lumber companies. Access might require either construction of a bridge or a low-water crossing. A large sediment control facility could be constructed here, but logistics would be difficult.

Indian Creek Pool

A natural pool at the mouth of Indian Creek has been filled with material washed from Indian Creek. Dredging here has been proposed for many years. Downstream landowners were concerned that deposits of new sediment might cause flooding during high water.

Sediment Flushing Flows

Channel and bank storage can also be considered as part of the sediment control system. During floods, sediment is deposited by water moving through vegetation on the banks. This material will probably stay until flows are sufficient to uproot the vegetation.

Channel storage can account for a large volume of sediment. For example, during the 1970s, DWR found from 2 to 4 feet of decomposed granite sand deposited from bank to bank in runs between riffles in the river near Poker Bar. Observations downstream revealed this situation was present in more than 20 miles of river.

In 1981, the USBR completed an evaluation of the hydraulic capability of the Trinity River to transport sediment.¹ The study reach was from GVC to Steel Bridge Hole, a river length of 5.75 miles. This report concluded that 423,700 acre-feet of water flowing at 6,000 cfs (a duration of 36 days) could remove 90 percent of the DG sediment present in the channel at that time. Flows below 4,000 cfs would not move significant amounts of sediment. Flows of 10,000 cfs would remove surface sand quicker, but could not remove sand from stream bottom gravels.

During 1983, a combination of high reservoir inflows and closure of the Clear Creek Tunnel for repairs caused the USBR to release higher than normal flows from Lewiston Dam. There were 14 days when the mean daily flows were between 4,000 and 6,000 cfs, and 39 days when releases were between 6,000 and 9,000 cfs. (Maximum instantaneous flow was 8,780 cfs on June 11, 1983.) There were 158 days when flows were over 1,000 cfs.

Records of the Trinity River sediment gaging station below Limekiln Gulch indicated that 545,000 tons (416,000 yd³) of sediment passed the gage in 1983.

These releases caused most of the sand stored in the river runs to be washed downstream. Runs that formerly consisted of a shallow, yellow-brown sand wasteland from bank to bank now had exposed cobbles. Natural pools were exposed that had previously been filled with sand. However, gravels and riffles were still cemented with sediment. The 1981 USBR study appeared to predict the results of the 1983 flow releases with surprising accuracy.

Sediment Transport Study

A sediment transport study is being conducted through a cooperative agreement between the U.S. Fish and Wildlife Service, John Hopkins University and UC Berkeley. These groups are developing a state-of-the-art sediment transport model for the Trinity River. The study sites for investigation are located at Poker Bar and Steel Bridge and include several of the pools that have been dredged through the Restoration Program. A final report for this study will be available in December 1993.

Capacity Evaluation of the Sediment Control System

An estimate of sediment contribution rates into the current ponds needs to be made to determine if additional sediment control facilities should be constructed. If additional capacity is needed, an analysis should compare the cost of constructing additional ponds with the cost of modifying (deepening) the existing ponds.

¹ Memorandum, to Head Sedimentation Section, from Robert I. Strand, March 11, 1981 and letter to EC Fullerton, Chairman Trinity River Fish and Wildlife Task Force, from David R. Schuster, August 19, 1981.

CHAPTER 6

SEDIMENT DISPOSAL ON DWR-HAMILTON RANCH

Two areas on DWR-Hamilton Ranch have been designated for disposal of sediment. The primary area is the former pasture located between Lewiston Road and the old dredger ponds. The secondary area is on the elevated terrace, south of Lewiston Road.

The primary disposal area drains to the north towards the historic dredger ponds and the river. After sediment disposal, this drainage pattern will be maintained so that the area can continue to be gravity irrigated from Ranch Ditch.

The horizontal surface will be gently mounded, with some hillocks to vary the topography and provide for a variety of vegetation types. If the centrally located wetland area is not relocated, the fill will slope down towards it. An erosion buffer of about 20 feet will surround the wetland.



Primary disposal area viewed from the constructed parking area. The ridge across the upper middle area is fill from pool construction. The dark area in the center is vegetation in the sedge-rush seep.

The USCE conducted a jurisdictional delineation for the DWR-Hamilton Ranch in 1988 (Figure 7). Since then, the pasture has not been irrigated. In 1994, DWR performed a wetland delineation of the primary sediment disposal area.

The 1994 study of the primary disposal area identified 6.7 acres as jurisdictional wetland, as compared to about 10 acres in the 1988 USCE delineation (Figure 8). The sedge-rush seep area of 1.9 acres was found to contain a high diversity of hydrophytic plants. About 3.5 acres of grass dominated wetland habitat surrounds this area. The outermost 1.3 acres contain grasses and facultative wetland species; some of this area is disturbed.

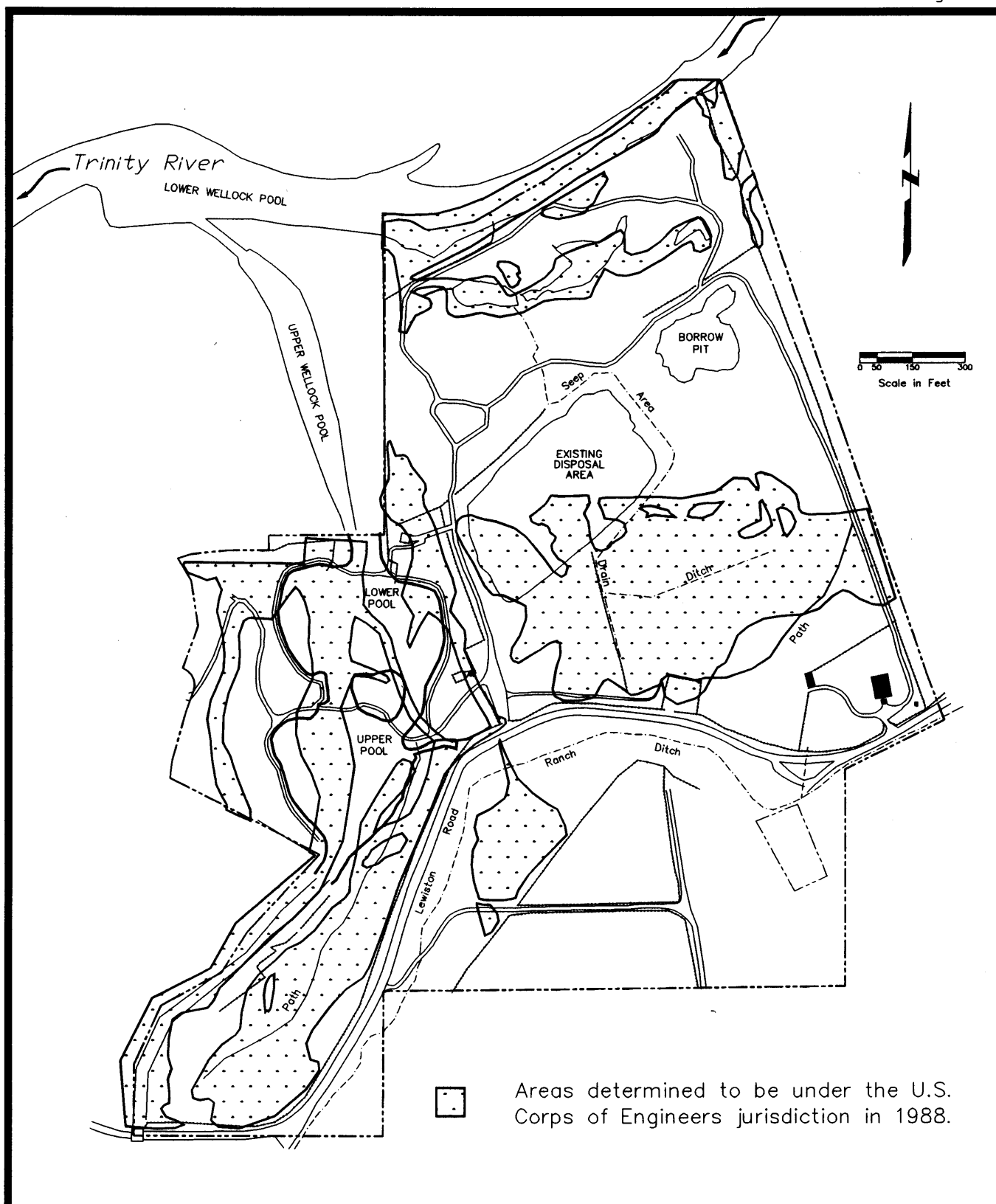
Table 2 indicates storage volume for the primary disposal area if fill covers all or parts of the pasture. The last line indicates the present volume of sediment deposited at the north west corner of the site.

Table 2
Potential Fill Volume at
DWR-Hamilton Ranch Pasture Disposal Area

Description	Storage in Cubic Yards	Percent of Maximum Storage
Fill around 1988 USCE wetland delineation	162,400	41
Fill around 1994 DWR wetland delineation	219,800	56
Fill around 1994 DWR high diversity wetland delineation	317,700	81
Fill all of pasture	393,000	100
Existing fill	45,200	12

A final design for fill on the pasture area is not included because Trinity County has not officially approved the rerouting of Snipe Gulch under Lewiston Road and because decisions regarding possible habitat compensation/mitigation of the pasture seep have not been completed.

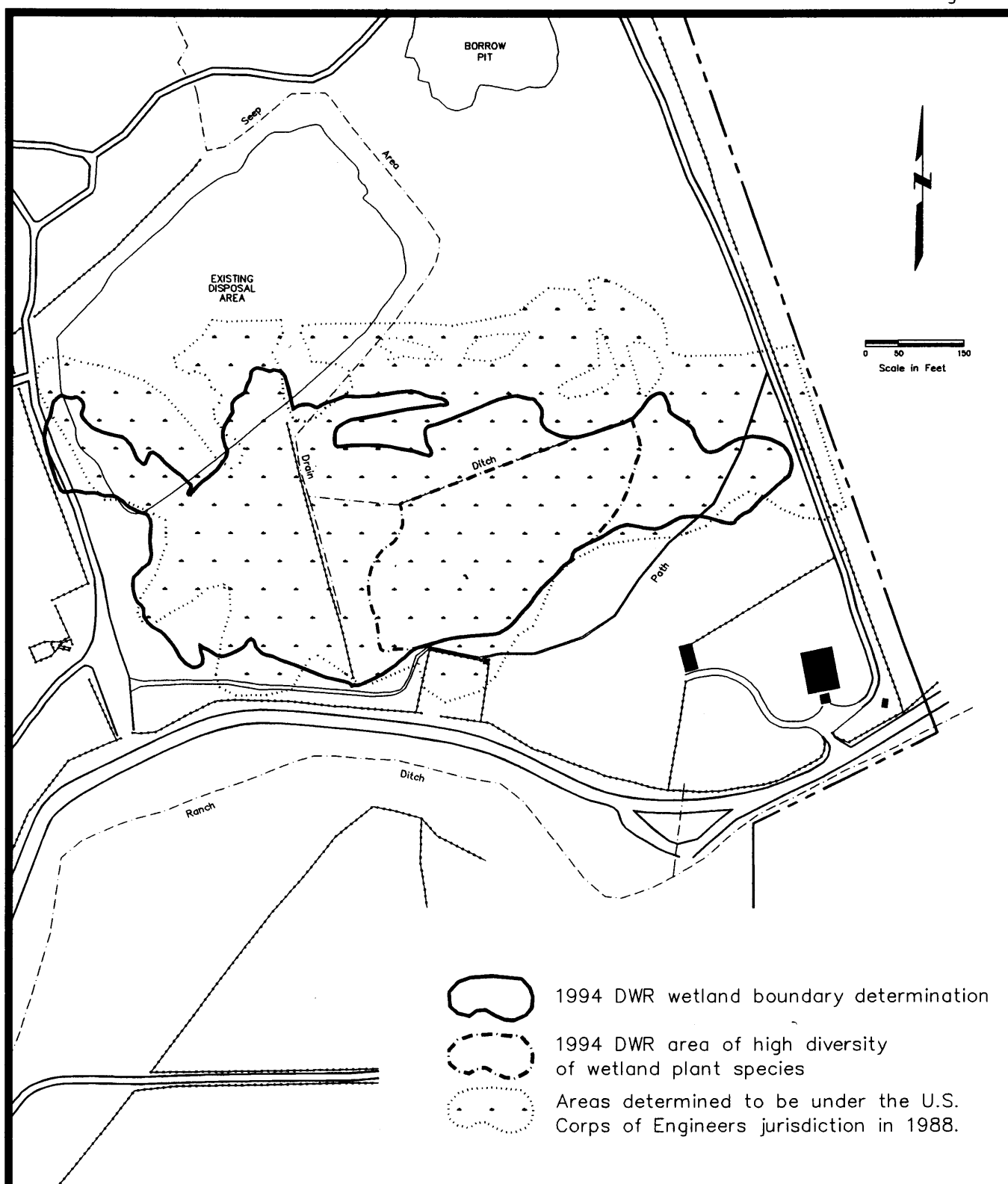
Figure 7



California Department of Water Resources, Northern District

DWR-Hamilton Ranch USCE Jurisdictional Areas

Figure 8



California Department of Water Resources, Northern District

DWR-Hamilton Ranch

Wetlands in the Primary Disposal Area



Secondary disposal area on upper terrace, south of Lewiston Road.

Designated Wetlands in Primary Disposal Area

The primary disposal site covers about 27 acres. Approximately 10 acres has been determined to be jurisdictional wetlands under Section 404 of the Clean Water Act (Army Corp of Engineers, San Francisco Office, 1988 determination). This precludes disposing of sediment on most of this area without wetland mitigation. See Appendix C for the 1988 USCE jurisdictional determination map.

Portions of the primary disposal area have been flood irrigated since the 1850s; as a result, some of these areas have supported hydrophytic vegetation in the past. A central portion of roughly 2 acres designated as the sedge-rush seep (Garcia, 1986) has a highly diverse plant species composition. At present, approximately 6.7 acres support "404" jurisdictional wetlands.

A new wetland delineation should be requested from the USCE. Photographic records and piezometer readings could be used to substantiate that the hydrology is not available to support wetlands in portions of the previously delineated pasture area. This may result in more of the area being usable for storage of sediment.

Wetland Seep in Primary Disposal Area

The 6.7-acre area north of Lewiston Road has characteristics defining it as a wetland, i.e., hydrophytic vegetation, hydric soils, and during some parts of the growing season, water. Within this area, a 1.9-acre section has a high diversity of wetland vegetation. Garcia and Woessner (1986) indicated that this area is a wetland with a relatively low value for wildlife.



Primary disposal area looking east. The sedge-rush seep is in the left center.

This seep is saturated in winter and spring. Before diversion begins in the summer, it usually dries out until there is no surface water in the seep and no free water in the cross ditch. When water is diverted into the Ranch Ditch, leakage increases flow in the Snipe Gulch drainage and causes water to percolate to the surface in the seep area. There is no direct channel between the drain ditch and the seep. After diversion starts, this process may take several weeks to get water into the seep.

There are three major alternatives with several variations to deal with the wetland issue. One alternative is to leave the wetland area in place and fill around it. Another is to cover the existing area and compensate for the loss at other locations on the property. A third alternative is to enhance the existing area, possibly by adding shallow ponds and rerouting Snipe Gulch flows. Figure 9 shows the potential wetland development areas.

Preserve and Fill Around the Seep. This alternative would preserve the existing seep as it is. Fill would be placed around all sides of the seep. A 20-foot buffer zone would be necessary to prevent potential fill slope erosion from affecting this wetland. Snipe Gulch would continue to flow in its existing channel south of Lewiston Road.

Since no open channels connect Snipe Gulch and the seep, water supply will not be affected by fill around the seep. If the Ranch Ditch is not used for a number of years, the species composition of the wetland vegetation during the summer growing season may change.

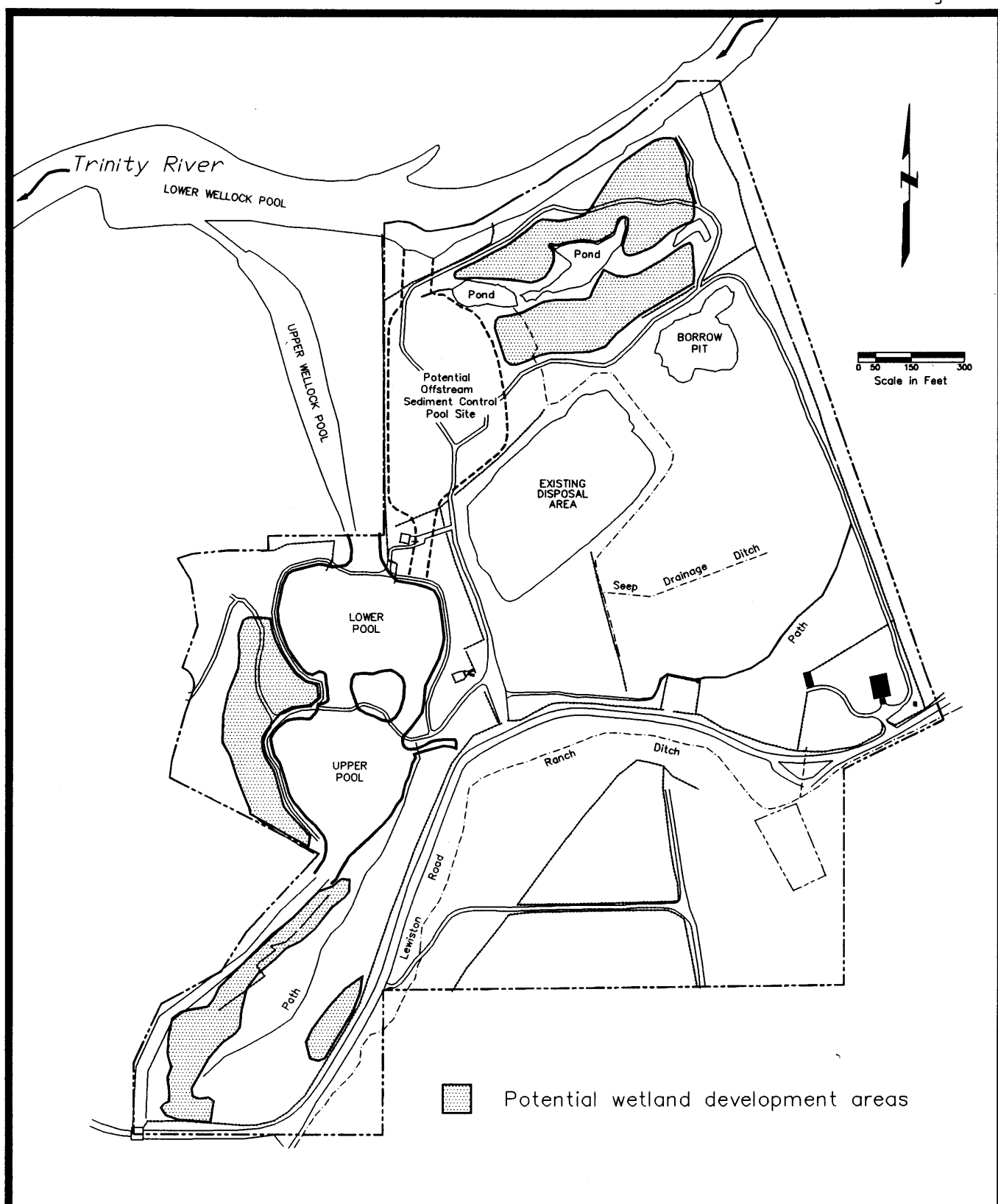
As fill is placed around the seep, drainage will be needed to prevent the area from becoming a pond.

Fill Over the Seep, and Compensate for Loss at Other Locations.

A second alternative is to place fill over the seep and create new wetlands at other locations on the property. This alternative would provide the most sediment storage and might result in a net increase of wetland habitat with a higher wildlife value.

Locations where wetlands might be created are shown on Figure 9. These are: area near the marsh between GVC and Lewiston Road (2.0 acres); west of GVC (1.8 acres); adjacent to the old dredger ponds (4.0 acres); the backwater area near the river (0.3 acres); shallow areas on the sides of both DWR pools (0.3 acres). These five options for the second alternative are discussed below.

Figure 9



California Department of Water Resources, Northern District
DWR-Hamilton Ranch
Potential Wetland Areas

(1) Increase Area of the Emergent Marsh Between GVC and Lewiston Road. Compensating for wetland loss in the primary disposal area by enlarging the existing marsh near Lewiston Road may be the best solution. The marsh has a good water supply during the summer, as discussed in the hydrology section. The elevated land between it and the creek is covered mostly with grasses. Removal of only a few feet of sandy soil would establish matching elevations to the existing wetlands. A berm could be left along the creek to control flow back to it. A rock-lined drain channel could drain off excess water without causing erosion.

Extending existing wetlands is usually the preferred method of compensating for wetland losses. Some existing vegetation can be transplanted and additional plants can be propagated from local seeds/cuttings. Transplanting vegetation from the original wetland is also a possibility. CDF conservation crews can be used to keep labor costs down.

The water supply for a restored wetland is critical. Water in the existing marsh is dependent in summer on the agricultural practices used on the adjoining farm land. If these practices change, then all the wetlands along the road can be affected.

If the adjoining land is no longer irrigated, then water could be released from the Ranch Ditch. A pipeline from an existing concrete box on the ditch could be installed to discharge water into the road drain ditch. The water would then be carried in the drain to a small culvert that discharges into the marsh. A small dirt ridge constructed across the ditch bottom could channel water into the culvert. In winter, the ridge would wash out and most drain water would flow to the 48-inch culvert near the upper pond.

(2) Construct Wetlands in Area West of Grass Valley Creek.

Portions of this area are delineated as under USCE jurisdiction on the 1988 determination map. Hydrophytic vegetation has developed as a result of a poorly maintained diversion ditch that leaks water into the area between the ditch and GVC.

Some of the land outside the delineated area could be contoured and converted into wetlands. Stands of blackberries and other brushy vegetation might be affected by the conversion. An analysis of existing vegetation conditions versus proposed conditions will be needed before this work is approved.

A potential source of water might be a diversion from GVC. It might be conveyed via the Wellock Ditch. An easement to share use of this ditch would be necessary. The easement might be negotiated in exchange for maintenance work or other compensation. An easement with those owners whose property the ditch crosses would also be needed. Purchase of water from the water right owner may be another possibility.

The Wellock Ditch, if used, should be deepened to remove sediment, and one or more turnouts should be installed. The flow capacity of the DFG fish screen might need to be increased.

DG sand moves in GVC most of the year. Buildup of sand can reduce flows in any GVC diversion. Methods and responsibility for maintaining the diversion would need to be defined.

If the Wellock Ditch is not shared, another diversion might be developed. One possibility is to run a pipeline from the Ranch Ditch, under Lewiston Road, past the emergent marsh and over the creek. A small existing culvert under Lewiston Road that drains into the marsh might be used during the summer. Other routes should be investigated.

A pumped diversion from one of the DWR sediment control pools is another possible water supply. An electric pump installed in the lower pool would have fewer problems from DG sand plugging the intake than one in the upper pool. A pump installation will have to screen out small fish and water-borne litter. Some rotating, self-cleaning pump screens are now on the market.



The old dredger ponds located between the Trinity River and the Primary Settling ponds.

Another way to establish wetlands in this area is to excavate down to the normal water table. Then wetland vegetation could be planted and maintained without requiring a source of water, or the annual expense of providing it. However, the low elevation might be subject to sedimentation by floodflows. This might increase storage capacity of the pool system.

(3) Enlarge the Old Dredger Ponds. Gravel from the old dredger tailing area could be removed and processed to supply spawning gravel to the river. The resulting excavations could be partially backfilled with sediment or fine material from the screening operation up to elevations near the water table level. Wetland vegetation could then be planted in this area.

Existing riparian vegetation may need to be removed during construction. Some might be left undisturbed if the project is carefully designed. Riparian plant species would be planted on the edges of the ponds to mitigate for the plants removed.

(4) Excavate Sediment From the River Backwater Area. During flooding of 1983, the backwater area south of Riffle I partially filled with sand. Fence lines along the river were buried to the tops of the steel posts. Some of this sediment should be removed to create wetlands and improve fish rearing habitat. The inlet should be deepened and extended upstream to insure water will continue to flow during the lowest releases from Lewiston Dam. Planting will replace existing riparian vegetation removed during construction.

(5) Increase Wetlands in Sediment Control Pools. If during future pool excavation the pools are enlarged, then the banks might be terraced to provide wetland areas. This might be most practical on the east side. Any new DWR pool construction should include such terraces in their design.

Enhance the Seep Habitat by Rerouting Snipe Gulch Drainage into the Primary Disposal Area. The third alternative involves Snipe Gulch, a small, intermittent stream that originates in the hills about 1-1/4 miles southeast of DWR-Hamilton Ranch. It flows from its narrow canyon through the Bowling property. Near Lewiston Road it turns west and flows in a constructed ditch between Lewiston Road and the bluff on the south side of the road. It crosses under Lewiston Road at a 24-inch culvert near the DWR construction gate and further west at a 48-inch culvert near the upper DWR pool. From both culverts, it accumulates into a narrow channel that flows to the upper DWR pool.

Since sediment is produced by Snipe Gulch during floodflows, Trinity County Department of Transportation must periodically clean out the existing ditch along Lewiston Road. When this ditch or the 48-inch culvert becomes filled with sediment, flooding of Lewiston Road can occur. Because of the combination of shallow slope from the culvert to the upper pool and backwater caused by high runoff in GVC, the culvert will probably become filled again, causing the road to be flooded.

Historic maps and records indicate that Snipe Gulch once flowed through the DWR primary sediment disposal area. Any previous channel seems to have been obliterated by farming practices.

An variation of this alternative proposed in the RCAA report and supported by a recent letter from the Trinity County Department of Transportation is to channel Snipe Gulch flows through the old pasture area. This might help improve wildlife habitat in the sedge-rush seep area and provide additional water flowing through the area when the Ranch Ditch diversion is not operated. Habitat values could be improved by excavating shallow ponds near the existing cross drain ditch.

Rerouting Snipe Gulch may provide additional water to the seep during the spring. Rerouting probably would not help in the summer, because Snipe Gulch essentially dries up.

Relocating Snipe Gulch flows would require installation of a large culvert under Lewiston Road near the caretaker residence. This would direct flows into a constructed channel through the primary disposal area. The channel should meander slightly to provide a natural looking stream. Hydraulic and soil studies would be required to determine the best routing to insure water would still flow in the seep.

Since Snipe Gulch carries an unknown quantity of sediment during winter runoff, provision should be made to keep this material out of the wetland area. A pond should be excavated in the relocated Snipe Gulch channel near the road. This pond would become a sediment trap to prevent material carried during high runoff from depositing in the wetland areas. It could also be designed to increase the riparian and wetland acreage.

The Trinity County Department of Transportation maintains Lewiston Road. Any proposal to reroute drainage and install culverts must be coordinated with them. As a cooperator in the Trinity River management work, the County might want to install the culvert.

Rerouting Snipe Gulch may have several major disadvantages to the sediment control project. The first is that the County's occasional maintenance problem of cleaning out the drain ditch will become a State problem because the sediment control pond and the channel would require periodic excavation. The second is

that the proposed ponds and channel area would reduce total sediment storage volume available for the project. The third is that changed drainage patterns could eliminate seepage and damage the wetland habitat.

DFG has suggested if the seep area is filled then Snipe Gulch should be rerouted over the fill area. This might provide opportunities to create some wetland and riparian wildlife habitat. A pond/sediment catchment basin located near the existing parking lot could provide additional habitat. Sediments could be removed under GVC pool maintenance contracts if the basin is sized large enough to contain sediments generated between projects.

Decomposed granite sand excavated from GVC will be very porous. If Snipe Gulch is rerouted over this fill, water will quickly percolate into the soil, leaving a dry channel except during significant flow events. Unless a way to create an impervious channel is found, little new habitat can be developed. However, since the Ranch Ditch crosses Snipe Gulch, releases of water into the channel might be possible to enhance summertime flows if water losses can be reduced.

Design of a Snipe Gulch modification project will need watershed runoff and sediment transport information. These data are not presently available.

Any newly created or enhanced wetlands should be monitored and evaluated for five years after work is completed. An adequate supply of water must be provided, and existing wetland vegetation should be protected during construction.

The ultimate configuration of the primary and secondary sediment storage areas is dependent on several factors still to be resolved. The extent of the delineated wetland area and the willingness of regulatory agencies to accept proposals for mitigation will influence plans for these areas. Therefore, a final recommendation is not included in this report.

CHAPTER 7

ENVIRONMENTAL ISSUES

Existing Wildlife Habitat

The report Wildlife Inventory of the Hamilton Ranch Site-Grass Valley Creek Sediment Control Study, (Garcia and Woessner, 1986), provides a partial inventory of the site's wildlife resources, documents preproject wildlife habitat conditions, and provides recommendations on the use of the property for sediment disposal and public recreation. Surveys of birds, mammals, reptiles, and amphibians were all conducted, and the methods of sampling are described in detail in the report.

The report concluded that seven habitat types would be unavoidably impacted by project development. It discusses the proposed mitigation, and points out that interagency coordination and communication will be necessary to "permit the full exchange of ideas and expertise so that the planned mitigation may have the greatest chance for success."

Since the wildlife inventory was completed, observations of migrating willow fly catchers Empidonax traillii have been made during U.S. Forest Service studies in 1990 and 1991. This species has been listed as threatened by the State. The biologists found no evidence of breeding sites during the study, but agreed there exists potential habitat for them: (1) clumped willows, (2) presence of water either standing or moving, and (3) an abundant insect supply. A thorough survey for this species must be completed before any work is done in mature willow habitat.

A sensitive species that has been identified on site is the western pond turtle Clemmys marorata. The western pond turtle is currently listed by DFG as a species of special concern. The USF&WS has been petitioned to list the turtle as threatened.

Pond turtle nesting can occur up to 1,200 feet from and 180 to 270 feet above stream beds on upland habitat. Young turtles overwinter in these nests and must traverse these areas to return to water the following spring. The DWR-Hamilton Ranch should be surveyed for the turtles, and a plan of protection should be developed.

A study done by Burton et al (1977) stated that at a minimum, one pair of bald eagles, Haliaeetus leucocephalus, a federally listed endangered species, feeds in the area of DWR-Hamilton Ranch. Records maintained by the Natural Diversity Data Base (1986) indicate bald eagle use upstream above the confluence of the Trinity River and Deadwood Creek (Deadwood Creek is about 4 miles upstream). No known nesting use has been documented on DWR-Hamilton Ranch.

Bald eagle roosting and foraging habitat may be temporarily impacted by construction activities, but upon completion of the restoration efforts, habitat values should be improved over present conditions.

USF&WS experts are currently planning to carry out additional surveys for bald eagle use along Trinity River in the near future.

The foothill yellow-legged frog, Rana boylei is currently listed as a State species of special concern. A recent study by the Pacific Southwest Forest and Range and Experiment Station indicates this species has been adversely impacted by habitat changes below Trinity Dam. A survey should be conducted prior to any new work on the property.

No other sensitive species is known to use the property.

Wildlife Habitat at Pool Sites and Primary Disposal Area Prior to Construction

The habitat types in the control pool areas formerly included stream channel, riparian areas, hardwood-conifer woodlands, and hardwood-conifer grasslands. The existing tree species includes Alnus rhombifolia white alder, Populus trichocarpa black cottonwood, Pinus ponderosa ponderosa pine, Fraxinus latifolia oregon ash, Quercus kelloggii black oak, and Salix lasiandra yellow willow.

The existing shrubs include Salix hindsiana sandbar willow, Rosa eglantera sweet-brier, Rubus procerus Himalaya berry, Rhus trilobata squaw bush, Acer circinatum vine maple, Corylus cornuta California hazelnut, Philadelphus lewisii mock orange, and Smilax californica California greenbrier.

Wildlife habitats in this area will be in transition for some time. Periodic dredging activities may create some small localized disturbances. All disturbed areas will receive revegetation treatments during the following fall/early winter period. Actual acreage of riparian vegetation will eventually show an increase from prepool construction due to the expanded shoreline.

The stream channel area will be enlarged compared to preproject conditions, due to the size of the sediment pools. This will create more open water habitat, although cover will be limited due to the homogeneous nature of the sediment traps. Some cover will be available from the deeper water areas of the pools. This habitat will be disturbed periodically by maintenance dredging. As the surrounding riparian vegetation gets reestablished, it will replace cover for fish, reptiles, and amphibians lost during the excavations. The pools will be monitored for fish passage problems and appropriate corrective actions will be taken, if necessary.

Upland habitat was also disturbed during the initial construction activities. This included mixtures of woodlands and grasslands. A certain amount of upland area has been turned into stream channel habitat, but the remaining disturbed upland areas surrounding the pools will be planted with appropriate native upland species.

Existing vegetation in the pasture-grassland primary disposal areas includes numerous species of grasses, herbs, and common and invasive weeds. The sedge-rush seep basin contains obligate and facultative wetland plants.

The wildlife species numbers and diversity in the disposal areas were all low to moderate (Garcia and Woessner, 1986). Local DFG, USF&WS biologists, and other agency representatives agree that the existing wetlands in the lower pasture area are "low value" wetlands, but still important to protect and enhance where feasible.

Habitat types in old gravel tailing areas are listed as riparian or gravel bar. Some of the gravel tailing areas have low habitat value because they are devoid of vegetation, or only sparsely vegetated. These areas have no dominant vegetation although they are typically surrounded by mature riparian vegetation. Some of these areas may be modified during gravel screening operations and may then be dredged to create additional ponds with higher habitat values.

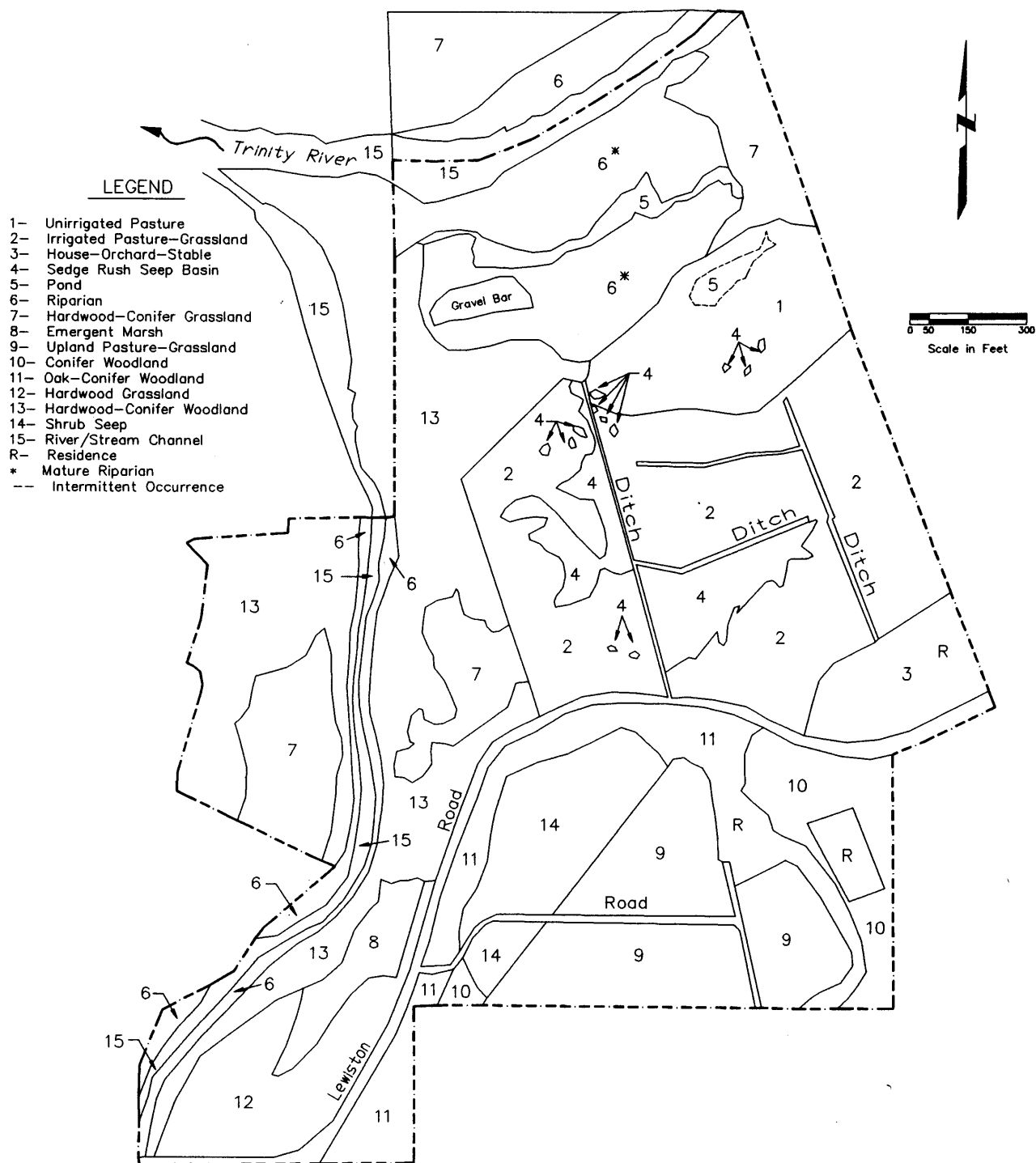
The upslope shrub seep south of Lewiston Road is a mixture of grasses, rushes, and shrubs dominated by rose and blackberry brambles, gooseberry, and willows. Some areas of these north-facing slopes support stands of Douglas Fir.

DFG's Natural Diversity Data Base list of natural communities (1983) indicates that the DWR-Hamilton Ranch site is composed of Cismontane Riparian Forest and Coast Range and Klamath Coniferous Forest. These native communities have been impacted and altered by mining, grazing, farming, ditching, and homesite development. Due to the extensive nature of these earlier activities, a more descriptive system of habitat classification was used for this site by Garcia and Woessner. Figure 10 is a map of the habitat types, and Table 3 indicates the acreage of each habitat type.

Vegetation surveys by DFG identified 16 habitat types for the site. This diversity of habitats includes marsh, riparian, stream and river channel, grassland, and various combinations of hardwood, conifer and grassland types. General vegetation surveys were done in March 1986 by DWR and additional detailed surveys were completed in 1987 and 1988.

A detailed survey of the pasture wetland and the proposed upper sediment control pool site for sensitive species was completed by Joyce Lacey of DWR in July 1987. The details are contained in Vegetation Surveys on the DWR-Hamilton Ranch, DWR 1987.

Figure 10



California Department of Water Resources, Northern District
DWR-Hamilton Ranch Habitat Types

Table 3
Areas of Habitat Types at the Hamilton Site¹

<u>Habitat Type</u>	<u>Area (acres)</u>
1. Unirrigated Pasture	5.2
2. Irrigated Pasture-Grassland	20.7
3. House-Orchard-Stable	2.5
4. Sedge-Rush Seep Basin	3.3
5. Pond	0.8
6. Riparian	12.5
7. Hardwood-Conifer-Grassland	8.9
8. Emergent Marsh	1.3
9. Upland Pasture-Grassland	7.7
10. Conifer Woodland	3.3
11. Oak-Conifer Woodland	5.2
12. Hardwood Grassland	3.9
13. Hardwood-Conifer Woodland	17.7
14. Scrub Seep	4.0
15. River/Stream Channel	<u>2.3</u>
Total	99.3 acres ²
<hr/> 1 Garcia, 1986 2 This study included about 9.3 acres north of the State boundary along the center of the Trinity River.	

An additional detailed survey of the upper DWR sediment control pool and a surrounding buffer zone was completed by Lawrence Janeway with assistance from Francis Biles of DWR in June 1988. This study included the measurement, identification, and mapping of all trees of diameter at breast height (4 feet) greater than 4 inches and all shrubby vegetation, which included trees less than 4 inches DBH. Details of this survey are contained in Vegetation Survey of the Grass Valley Creek Sediment Control Pool-Phase 1, DWR 1988.

A compiled vegetation species list can be found in Garcia and Woessner's Wildlife Inventory of the DWR-Hamilton Ranch prepared for DWR. An addendum to this list was developed by Joyce Lacey, 1987.

Two plant species that are of special concern are known from the vicinity of the project site. These are the Trinity Alps Daisy Erigeron flexuosus, and threadleaved beardtongue Penstemon filiformis. Erigeron flexuosus was listed by the California Native Plant Society as Rare and Endangered in California but is now listed as common. Penstemon filiformis is a candidate for federal listing. Garcia and Woessner (DWR 1987) recommended

follow-up surveys to determine their existence or absence from the areas to be disturbed. Lacey et al. did not find evidence of these during a survey in 1987.

Revegetation Plan

The report Hamilton Site Revegetation Plan, Grass Valley Creek Trinity County, California, May 1989, was prepared under a DWR contract with the Redwood Community Action Agency. This plan describes vegetation conditions at DWR-Hamilton Ranch and suggests methods for replacing habitat affected by the sediment control work. It contains a draft of Special and Technical Provisions for revegetation contracts that details methods needed to do the work at the ranch.

Current Wildlife Habitat Work

Probably the most significant action the State has taken to improve wildlife habitat has been to cease active ranching activities. This has allowed stands of existing vegetation to become thicker and more dense. In fact, areas where roads and trails existed have become so overgrown that trimming is necessary to maintain access for normal property management activities.

Cattle grazing can result in reduction of vegetation diversity. Young tender sprouts from both grasses and bushy plants are eaten before they mature. Seed heads may be destroyed prior to maturing. New leaves and shoots are nibbled from ground level to cattle head height. This results in fewer species, mainly grasses, in the grazing area. Heavy grazing of willows appears to adversely impact willow fly catcher habitat.

A number of bird nesting boxes have been installed on the ranch by the caretaker. Wood duck nesting boxes were placed near the sediment control pools and dredger pond. Also, nesting areas have been constructed by boring holes in tree trunks for other species. This low-cost work should be continued.

Several mature cottonwood and willow trees were moved to the disposal area during pool site clearing. These were replanted with their bases below the ground water table. Backfilling of sediment and soil left the tops extending above the fill. Although leaves did sprout from some of the trees, none survived the process after two years. A few of these snags will be left standing for roosting use by raptors.

Transplanting willows and cottonwood trees into the water table has reportedly been successful in other areas. However, without equipment to protect the root ball and time to allow the trees to become established prior to gradual backfilling around the trunks, this experiment will not be repeated.

During sediment pool site clearing, some of the trimmings from trees were left piled up in open areas. These piles provide habitat for some bird and small mammal species. If additional land is cleared for project activities, some of the slash should be saved for this purpose.

Fishery Improvement Projects

DWR has submitted project proposals for funding to the Trinity River Field Office to improve fishery habitat in the river. We suggested spawning gravel be placed upstream of the old Riffle I site. In order to keep velocities in an acceptable range, some of the river bottom might be excavated before gravel is placed.

The excess material should be used to extend the existing Riffle I berm upstream along the bank. This way a rearing habitat channel could be constructed. The sediment deposited in the backwater area beside Riffle I could be removed with a bulldozer to enlarge it. Part of the backwater area could be deepened to provide cover for fish. Areas near the edge of the site could be graded to develop wetlands. A net increase in high-quality wetlands might help compensate for some wetland loss elsewhere on the property.

With the proper equipment on site, the backwater work could be completed in a day. Depending on how far upstream the berm is extended, this work should also take about a day or two. This work might be scheduled as components of larger projects to reduce mobilization and administrative costs.

Future Wildlife Habitat Work

Riparian vegetation found along watercourses is usually considered best if it is periodically renewed. Normally this is caused by occasional flooding that washes away banks and drops material elsewhere. New deposits are conducive to vegetation germination.

In the case of the DWR pools, the shoreline has expanded considerably from that existing prior to construction. This provides opportunity to increase the net amount of riparian habitat available. However, since the pool banks were sloped and covered with rocky material, erosion due to flooding may not be significant.

As riparian vegetation becomes established and reaches maturity, selected areas may require removal so that new vegetation can replace it. This work could be done by CDF conservation crews, or as part of a dredging contract. Periodic examination of the riparian areas should be made by wildlife biologists. A decision of how to best manipulate the habitat can then be made.

As more information is gathered about the willow flycatcher habitat preference in the Trinity Basin, steps might be taken to establish preferred vegetation. For example, willow fly catchers are most numerous where extensive thickets of low, dense willows edge on wet meadows, ponds on backwaters. Before work of this type is begun, consultation with wildlife experts is essential.

The disposal areas can be used to provide forage for deer. Ceanothus Integerrimus, or deer brush, should be planted on the disposal slopes. Irrigation and fencing the first year would be required to help the plantings to become established.

CHAPTER 8

RECREATION DEVELOPMENT AT DWR-HAMILTON RANCH

Present Public Recreation Access

Recreation generally has centered around several activities which are limited by DWR's "no vehicle access" and "no hunting or camping" policies. These activities include fishing, hiking, nature study, swimming, and picnicking.

The foremost activity has been access to the river for salmon and steelhead fishing. Access to the creek and sediment control pools has mainly been during the warm weather for swimming and sunbathing. Some people use the trails and haul roads for exercise. Nature study, especially by school classes, has been more limited. Berry picking is a seasonal activity.

A parking area constructed in 1987 has reduced incidence of parking on the narrow Lewiston Road shoulders and at the construction gate.



This parking area allows visitors to stop off Lewiston Road.

An 8-foot chain link fence was installed in 1988 along portions of the west and north property lines. This fence was constructed to reduce public access to the private lands adjacent to State property. Sections extending into the lower sediment control pool were designed to limit access to the steep creek banks downstream and still allow unimpeded passage of floodflows.

Alignment of the fences is offset approximately 2 feet or more onto State property. This offset allows access for maintenance and clearing brush.

Trails from the parking area have been maintained by mowing the weeds and star thistle. One trail extends west to the GVC pools. Another goes northeast to intersect the road along the east property line. This extends to the river at the northeast corner of the property and intersects a road parallel to the river.

Another trail had been cleared completely around the dredger ponds. A trail leads south along the wetland area near Lewiston Road. West of GVC, a trail from the cul-de-sac on Wellock Road leads through a small gate, down an access road, and back to the pool banks.

Little or no recreation use occurs on the upper terrace. During hunting season, adjoining landowners post the access road against hunting. The historic Lowden toll road route is through the yard on the Bowling property, which discourages access. The old road formerly connected to roads at Fawn Lodge near Highway 299, and is now blocked by fences and barricades about a mile from DWR-Hamilton Ranch.

Future Recreation Development

Day-use activities should continue. This use is mostly compatible with the multiple-use nature of the property. Since grazing is no longer practiced, vegetation will become thicker and more overgrown. Clearing of trails should be continued. Mowing by the resident caretaker is suitable for the main trails on flat land. Annually, the CDF conservation crew should be used to maintain the other trails and to clear diversion ditch banks for maintenance access.

Trinity River Fishing Access

During salmon and steelhead runs, fishermen use the parking area and walk to the river. Sanitation facilities should be installed near the River.

Picnic Area on West Side of GVC

Development of a picnic area to the west of the upper pond has been suggested to DWR. This proposal is considered impractical

because the area to construct parking facilities on Wellock Road is limited. A meeting with landowners along Wellock Road revealed almost unanimous opposition to this suggestion. A small gate near the end of Wellock Road will be left unlocked to allow public access to this area. A larger drive-through gate at the same location will remain locked. A key to the lock on the larger gate and the combination to a gate east of GVC was given to the Wellock family so that stray domestic animals could be retrieved.

River Raft Access and Stopover Site

A river raft access or stopover site has been suggested at the river bank clearing on the northeast corner of the property. If this is developed, sanitation facilities should be installed. Trash bins and portable toilets should be used. A pit toilet might be constructed at the top of a knoll.

To use this area for launching rafts would probably require upgrading the road along the east line to provide vehicle access. It might also require vehicle parking at the river bank. Since DWR policy limits vehicle access and limits disturbance of vegetation not associated with the sediment control operations, raft-launching facilities may not be compatible with the plan.



Trinity River looking upstream from DWR-Hamilton Ranch.
View is near the proposed river raft access site.

Recreation Use of Sediment Control Pools

During the summer, the sediment control pools are receiving increased public use for swimming and sunbathing. The side slopes of the pool banks have been designed with gently sloping banks to lessen danger for both animals and people who enter or exit the water. The upper pool has sandy bars that develop soon after dredging and are attractive to swimmers and sunbathers. Some people picnic at the site.

No public sanitation facilities are on the DWR-Hamilton Ranch property. A pit toilet or a commercial toilet service should be installed near the upper pond. In addition, trash barrels should be installed to help reduce litter. A local garbage collection company could empty them periodically.

In the event of flood flows in GVC, portions of the pool banks might be eroded. If this happens, work should be quickly performed to maintain the sloping banks for public safety.

CHAPTER 9

MANAGING THE PROPERTY

Proposal to Remove all Structures From State Land

Sediment control and disposal and wildlife habitat restoration are the current management activities. One mobile home is on the property and it is currently used as a caretaker residence. A second mobile home located near the secondary disposal area on the upper terrace was removed in 1992. This mobile was in poor condition, had no acceptable water supply, and had not been occupied for about four years.

It has been suggested that all structures be removed and the area turned into a use area for recreational purposes. The entire site then could be managed for fish and wildlife and recreation.

Those evaluating this suggestion must remember that vandalism has occurred fairly often since the State purchased the property. The State had to replace almost all the windows in the caretaker residence because of damage by pellet guns. Fences have been cut, fires started, plants removed, irrigation equipment stolen, and telephone lines damaged. Livestock has repeatedly entered the property, damaging planted vegetation.

Without a caretaker to patrol the property, we could expect unauthorized woodcutting, hunting, and vehicle trespass. The aluminum irrigation system would be a prime target for theft.

The caretaker is expected to pick up trash, maintain fences and trails for public access, represent the State to the public, operate the irrigation system, keep records for various studies, and look out for illegal conduct. This service is considered an essential maintenance activity.

The State provides a three-year lease for the caretaker residence. A property appraisal is conducted at the beginning of each new agreement. The caretaker's payments and activity reports are sent monthly to DWR in Sacramento. Copies of the activity reports are on file at the DWR office in Red Bluff.

In the event minor repairs or maintenance are necessary, the caretaker, with prior DWR approval, can purchase materials and submit the invoices as credit against the monthly lease payment. Completion of all work is then verified by the State.

Major repairs or equipment purchases (e.g., irrigation system components or domestic water treatment system parts) are handled through the normal State procurement process at the Red Bluff office, or through the Trinity River field office.

After paying for upkeep of the property, any net lease income is applied to the State General Fund. It is not credited to the DWR-Hamilton Ranch Management Program. When the State and federal governments perform a cost-sharing reconciliation, the income from the caretaker lease should be included in the accounting process.

While DWR-Hamilton Ranch is under State ownership, DWR will continue to maintain and lease the residence to a caretaker.

Pump Irrigation System

A 30-horsepower irrigation pump is located on the east bank of GVC, north of the lower pool. Until July 1993, electric power was served by Pacific Gas and Electric Company. The rate schedule was for off-peak power, i.e., lower rates in evenings in summer and daytime hours in winter. In July 1993, P G and E transferred its Trinity County interests to the Trinity Public Utility District. The District does not offer off-peak rates.

To install the irrigation pump, a pit was excavated with a hydraulic excavator down to cemented gravel layers. The pit was backfilled with 1-1/2-inch graded gravel up to the water table elevation and covered with native soil. Filter fabric was used to keep fine particles out of the gravel. Appendix B provides a diagram of the pump installation.

This shallow well does not recharge quickly enough to allow continuous running. One solution is to recharge the sump with surface water. Water from the ranch ditch could be conveyed to the southeast corner of the pump embankment. There, the gravel fill was brought up to near the surface, in anticipation of this need.

A second solution may be to excavate a channel from the sump southward to the lower DWR pool. Backfilling the trench with coarse gravel and covering with filter cloth and native material would make the pump a direct diversion from the creek. Until sediment filled the lower pool, plugging with DG sand would not be a problem. A screen trash rack should be used to reduce plugging of the gravel by stream litter.

Invasive Plant Species

Himalaya berry brambles are prominent in much of the riparian areas. This species would be difficult to eliminate, which might not be desirable, as it does provide significant habitat value.

One invasive species that should be controlled is the yellow star thistle Cirsium solstitialis. This weed covers much of the primary and secondary disposal sites. It has a long annual growth cycle beginning during the fall rains, a long tap root, prolific seed production, and seeds that can remain dormant in the soil for long periods. These features make star thistle difficult to eradicate.

Methods generally used to control this plant include mechanical (tillage, mowing, grubbing, or excavation), fire, chemical (herbicides), and biological (insects, plant competition and livestock grazing). Most are not practical for the DWR-Hamilton Ranch. Following are three methods that may be used to control (but not eliminate) star thistle.

Periodic mowing during the growing season may help to control the weed. The most effective time is during the early flowering stage, after much of their root reserves have gone into producing flowers, but before seed production is commenced. Repeated mowing probably will be necessary because regrowth generally occurs. In general, mowing will be most effective when soil moisture is low and no watering or rainfall follows the mowing.

A method that can be used on the disposal areas during construction work is to remove and bury the top 6 inches of soil containing the seeds of the thistle and numerous annual grasses and weeds. The top 6 inches of soil from the pasture areas should not be used on top of the spoils.

The Trinity County Agricultural Commissioner has made experimental placing of a biological star thistle control at DWR-Hamilton Ranch. The Bangasternus orientalis or seedhead weevil is a beetle-like insect approximately 1/4-inch long. The adult female lays her eggs on the flower bud of the plant.

When the eggs hatch after about two weeks, the larvae feed on the seed-head tissue which indirectly causes the loss of 60 to 90 percent of the viable seeds in the head. Adult weevils emerge from the seedhead and later overwinter in the duff near the plants. They emerge the following spring to complete the cycle.

The County is presently evaluating survival and effects of the weevils. If successful, some will be collected for distribution to other areas. Until the County study is evaluated, selective mowing of existing trails will be the primary weed control method used.

Surplus Land Disposal

Mr. Don Coffin, an adjoining property owner to the south, has built a second home on his property. According to County zoning requirements for minimum lot size, he needs an additional two acres on his parcel to retain his first home. He has recently asked DWR if we can sell two acres of the hill side next to Lewiston Road. He has not yet made a written offer.

A possible negotiation term may be for Mr. Coffin to guarantee the State a supply of water from his irrigation ditch and diversion. His irrigation ditch ends at DWR Ranch Ditch, and at times he has supplied us with some of his water to irrigate the orchard at our caretaker's residence.

The advantage to the State would be a cost savings each year the Ranch Ditch diversion is installed and removed. To use this diversion, a temporary dam structure must be installed in the creek. A bulldozer is usually used both to construct and remove it. A permanent structure designed to withstand potential flood and debris flows would be very expensive. The diversion ditch is prone to plugging by the large amounts of DG constantly moving through the watershed.

The shared Knowlden-Coffin Diversion is located farther upstream in the GVC canyon where, due to the configuration of the channel, inflow of DG sediment is easier to control. Usually only a 1-foot-high dam is required, angled to the flow. Fish passage is not a problem.

To use the Knowlden-Coffin Diversion for State water deliveries, the ditch may need to be cleaned out or even lined. Two suspended pipelines that cross GVC may require enlarging to provide enough capacity. Easements must be granted by the two property owners involved. An appropriative water right application may be required to use this diversion. Nonuse of the existing Ranch Ditch diversion may result in loss of appropriative water rights. At present, these issues have not been evaluated.

Conflicting Property Rights

In the southeast area of the DWR property, a 5/8-acre parcel owned by Steve and Cathy Bowling of Long Beach exists entirely within the main parcel. Improvements include an old residence and several outbuildings. Some of these buildings and a picket fence are constructed partially on State lands. A stream diversion pump house that supplied water to the double-wide trailer formerly located on the upper terrace was on the Bowling property. The pump house has been abandoned by DWR.

Access to the parcel is by an old road with an easement issued to the County. This road has been abandoned by the County, so legal access to the parcel probably is in doubt.

Negotiations should be conducted with the property owner to provide clear title for their access and to the land the structures are on. One option is to provide the owner with an encroachment permit, charging the State's administrative costs for the permit.

A second option is to issue a Director's Deed for the areas in question. This will require a land value appraisal and payment for the property in question.

A third option may be to declare the southeast corner of the State land from Lewiston Road up the Snipe Gulch Canyon (about three to four acres) to be surplus to the needs of the project,

and offer to sell that corner to the Bowlings. Since this land is all wooded steep hill sides, it has no potential for sediment storage. (It does have wildlife habitat value.) The deed would reserve an easement to the State for maintaining and using the GVC irrigation ditch system.

The best solution will have to be determined by DWR Land and Right-of-Way agents through negotiations with the Bowlings.

The most easterly DWR property line has been assumed to be along the fence to the east of the caretaker's residence. A pre-liminary survey by DWR indicates the line is actually 30 to 50 feet east of the existing fence.

This property line should be surveyed and permanent markers installed. A local survey business should be engaged for this work to reduce possible criticism about the State "confiscating" private property.

A driveway to private property from Wellock Road crosses DWR property. The appraisal for purchase of the Hamilton Ranch did not reveal an easement for this road. This situation should be corrected.

One solution might be to declare this area surplus to the needs of the project and sell it. If that is done, an easement for State access should be retained.

Construct a New Sediment Control Pool Upstream of Exiting Pools

Initial plans for sediment control features on DWR-Hamilton Ranch property included pool construction upstream of the upper pool location. Several issues have caused DWR to concentrate on developing sediment storage downstream.

First, the proximity of wetlands east of the creek limits the potential area. Although excavating without filling is allowed by the federal government, regulatory agencies may resist approving any project that might reduce the quality of the existing wetland.

In addition, GVC in this area has a fairly steep gradient. This will probably limit the ability to build a long pool. The County will probably be concerned that possible head cutting above the pool could damage the Lewiston Road bridge footings.

Pools might be constructed in this area using portions of the privately owned terrace on the west side of the creek. The owners have said they would consider discussing such a project, but none has endorsed the concept.

Since there are minimum lot sizes in the area, purchase of enough land from the adjoining owners may not be practical. However, an easement or a lease might be used if the owners were willing to support this work.

Construct a New Sediment Pool Downstream of Existing Pools

A new sediment control pool on State land could be excavated downstream from the existing pools. This pool would be constructed east of the chain link fence and be parallel to the pool on private property at the mouth of GVC. Its outlet would be into the shallow pond near the river bank. The size would probably be 600 feet long and 200-300 feet wide.

A pool at this location would be an off-channel storage pool. Grass Valley Creek would not flow through it except during high water. An inlet and outlet would be constructed like those at the existing pools.

This pool would likely pond ground water as do the old dredger ponds. Its banks would become covered with willows and alders. Reeds and rushes could be planted in the shallow water near the banks.

Excavating this pool may uncover deposits of spawning size gravel, which should be saved for future processing. Storage sites for this material are available on the old dredger tailing areas.

Some very large trees are located in this area. Attempts to leave islands for them will considerably reduce the pool capacity and may cause them to die. Clumps of willows and blackberries could be planted near the water, to compensate for those removed.

An alternative to this pool might be to purchase the GVC channel area between State land and the Trinity River. Then the existing pool above the mouth could be widened onto State property. This could double or triple storage capacity below the DWR pools. In the past, some members of the family controlling that parcel indicated they would not be interested in selling land to the government.

Other Management Considerations

Prospective developers of the Meadows Golf Course on property just east of DWR-Hamilton Ranch asked about leasing portions of the State land to extend their proposed development. Since a secondary use of DWR-Hamilton Ranch is wildlife habitat, and material deposited on the pasture may be later removed to increase project life, this proposal was not compatible with objectives of the management plan.

In July 1994, BLM purchased this 200-acre parcel. A management plan for the property is scheduled to be prepared in 1997. During preparation of this plan, consideration should be given to using a portion of the BLM property for future sediment storage. This would help extend the life of the GVC sediment control project. Ultimately, BLM might be considered a logical long-term manager for both parcels of land.

Other parties have suggested portions of the property should be leased for grazing. This proposal could help to keep the area visually attractive and limit danger of wildfire by reducing tall grass in open areas. The upper terrace, the area west of GVC, and the area above the upper pool may be suitable for such a lease. The disposal area should not be leased unless fencing is provided to protect newly planted vegetation on the spoil areas.

A lessee might be interested in irrigating portions of the leased area. A condition of the lease might be to provide water from GVC through existing ditches. This use would help exercise the State water rights and help keep the area visually attractive.

DWR-HAMILTON RANCH
MANAGEMENT PLAN

APPENDICES
A THROUGH G

APPENDIX A

REPORTS RELATED TO THE
DWR-HAMILTON RANCH
AND THE SEDIMENT CONTROL SYSTEM

APPENDIX A
REPORTS RELATED TO THE
DWR-HAMILTON RANCH
AND THE SEDIMENT CONTROL SYSTEM

I. Environmental Documents

- A. Negative Declaration and Initial Study, Trinity River Pool and Riffle Construction for Fishery Restoration, Revision of March 1984 Negative Declaration, (State Clearinghouse #84022805). DWR Northern District, April 1985.
- B. Sediment-Control Work Near the Mouth of Grass Valley Creek, Supplement to the Environmental Document: "Negative Declaration and Initial Study, Trinity River Pool and Riffle Construction, for Fishery Restoration", April 1985. DWR Northern District, May 1987.
- C. Notice of Determination. Trinity River Pool and Riffle Construction for Fishery Restoration. State Clearinghouse Number 84022805. Filed and posted by Governor's Office of Planning and Research, June 21, 1985. DWR Northern District, April 1985.
- D. Acknowledgement Letter from State Clearinghouse. Letter to Edwin J. Barnes from John B. Ohanian, Office of Planning and Research, stating the draft environmental document SCH# 84022805 was submitted to State agencies for review. The review period was closed, and no agency had comments. May 31, 1985.
- E. Grass Valley Creek Debris Dam, Trinity California: Final Environmental Impact Statement. U.S. Bureau of Reclamation. 1987.
- F. Environmental Assessment, Trinity River Sediment Trap. (BLM-Southern Pacific pool) U.S. Bureau of Land Management, June 1983.
- G. Draft Finding of No Significant Impact, Trinity River Pool and Riffle Construction for Fishery Restoration. U.S. Bureau of Reclamation, April 1986.
- H. Draft Environmental Assessment for Trinity River Pool and Riffle Construction for Fishery Restoration. U.S. Bureau of Reclamation, April 1986.

II. Archeological Studies

- A. An Archeological Survey, Assessment, and Recommendations for the Hamilton Ranch Parcel, Trinity County, California. By John Kelly, State Archeologist II, Department of Parks and Recreation, March 1986.
- B. An Archeological Survey, Assessment, and Recommendations for the Ohio Flat Mining district (CA-TR-943), Trinity County, California. By John Kelly and H. John McAleer, U.S. Bureau of Land Management-Redding and California Department of Parks and Recreation, 1986.

III. Wildlife Inventories

- A. Wildlife Inventory of the Hamilton Site-Grass Valley Creek Sediment Control Study, a Status Report. by Jesus R. Garcia, Wildlife Biologist and Anne Marie Woessner, Graduate Student Assistant, Department of Fish and Game, November 1986. See also addendum in Lacey, Species list, Hamilton Property Pasture Wetland.

IV. Vegetation Studies

- A. Hamilton Site Revegetation Plan, Grass Valley Creek - Trinity County, CA. Natural Resources Services, Redwood Community Action Agency, May 1989.
- B. Species list, Hamilton Property Pasture Wetland. Joyce Lacey, DWR Northern District, July 29, 1987. Also includes an Addendum--Hamilton Site plant list for the Garcia Wildlife Inventory.
- C. Vegetation Survey of the Grass Valley Creek Sediment Control Pool - Phase I. (upper DWR pool.) Joyce Lacey, DWR Northern District, July 1, 1988.
- D. Vegetation Survey of Sediment Control Pool Number 2 on Grass Valley Creek. (lower DWR pool.) Joyce Lacey, DWR Northern District.

V. Recreation Study

- A. Concept Plan, Hamilton Ranch Park, Trinity County California. A draft map by Robert E. Snieckus, Landscape Architect, USDA, Soil Conservation Service, January 25, 1988.

VI. Feasibility Studies

- A. Grass Valley Creek Sediment Control Study. DWR Northern District, April 1978.

VII. DWR Sediment Removal Project Reports

- A. 1989 Evaluation Report, Bucktail Pool Excavation and Grass Valley Creek Sediment Removal at the Upper and Lower DWR-Hamilton Ranch Pools. (Bucktail and DWR- Hamilton Ranch pools.) Department of Water Resources, June 1991.
- B. Grass Valley Creek Sediment Removal, Upper DWR Pool, 1988 Evaluation Report. (DWR-Hamilton Ranch pool.) Department of Water Resources. December 1989.
- C. Grass Valley Creek Sediment Removal, 1987 Evaluation Report. (Ponderosa Pines pool and BLM-Southern Pacific pool.) Department of Water Resources, June 1988.
- D. Grass Valley Creek Sediment Removal, 1986 Evaluation Report. (Two pools at the mouth of Grass Valley Creek.) Department of Water Resources, January 1987.
- E. Grass Valley Creek Sediment Removal, 1985 Evaluation Report. (BLM-Southern Pacific pool.) Department of Water Resources, December 1986.
- F. Grass Valley Creek Sediment Removal, 1984 Evaluation Report. (Two pools at the mouth of Grass Valley Creek.) Department of Water Resources, October 1985.
- G. Grass Valley Creek Sediment Removal, 1983 Evaluation Report. (BLM-Southern Pacific pool.) Department of Water Resources, December 1983.
- H. Action Item No. 3--Interim Grass Valley Creek Sediment Removal, 1981 Evaluation Report. (Riffle ripping project.) Department of Water Resources, February 1981.
- I. Action Item No. 3--Grass Valley Creek Sediment Removal, 1980 Evaluation Report. (Baxter pool.) Department of Water Resources, February 1981.
- J. Trinity River Sediment Removal Evaluation Report. (Experimental suction dredging work.) Department of Water Resources, May 1979.

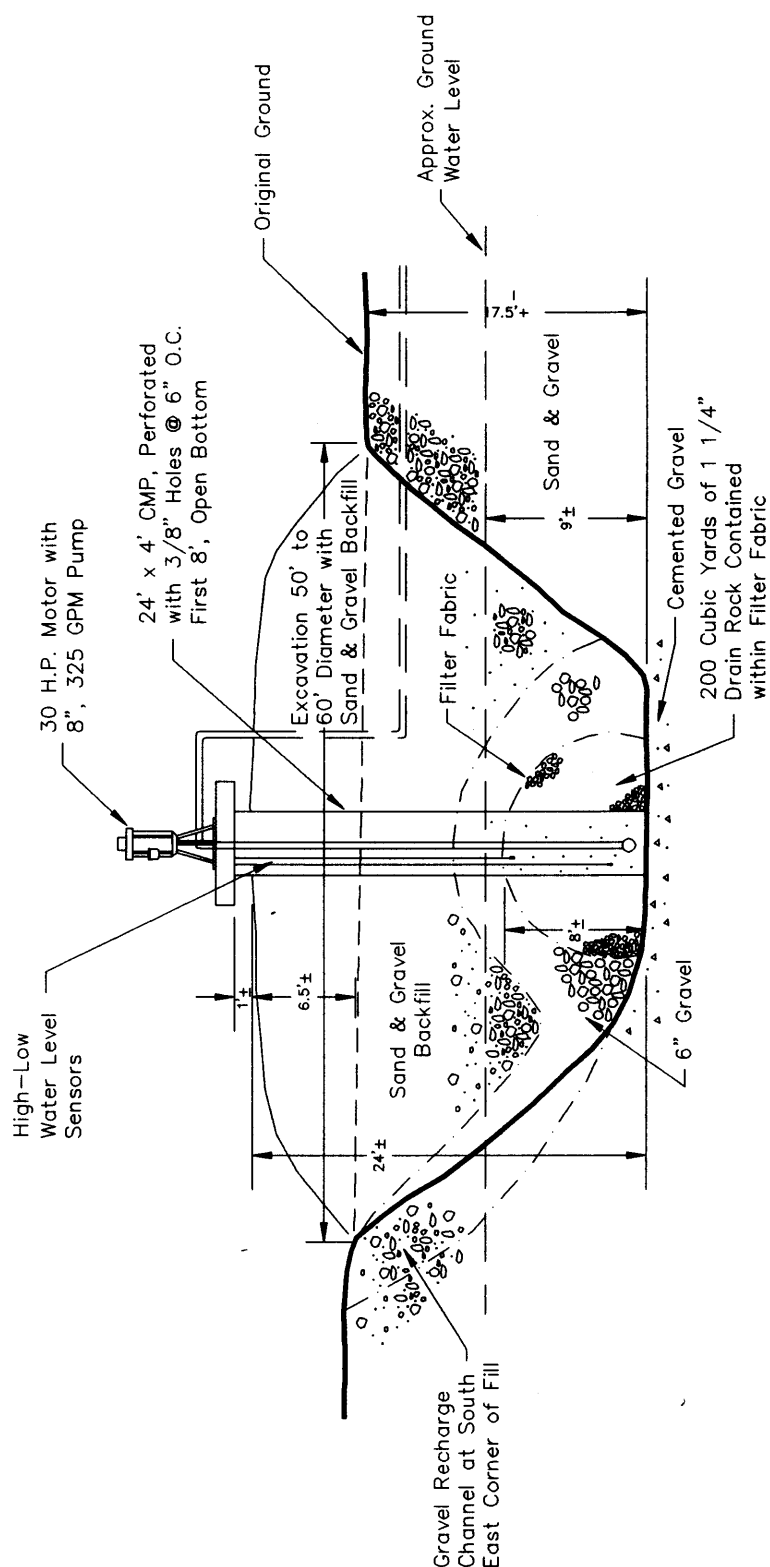
VIII. Sediment Studies

- A. Toward a Strategic Plan for Sediment Control Within the Grass Valley Creek Watershed. Gregory A. Thomas, Richard Roos-Collins, Natural Heritage Institute, August 1991.

- B. Sediment Study, Grass Valley Creek Watershed, Trinity County, California. USDA, Soil Conservation Service, February 1986.
- C. Inventory of Sediment Sources, Grass Valley Creek Watershed USDA Soil Conservation Service. February 1992.
- D. Inventory of Sediment Sources, Grass Valley Creek Watershed Supplemental Report. USDA Soil Conservation Service. May 1992.
- E. Sediment Yield Study, Grass Valley Creek Watershed, Trinity County, California. Jerald M. Curry, U.S. Soil Conservation Service, September 1980.
- F. Reconnaissance: Deposition of Fine Sediment in Spawning Gravels, Upper Trinity River, California. U.S. Geological Survey, 1970.
- G. Memorandum: Sediment Transport Studies, Trinity River Below Lewiston Dam-Trinity River Basin Comprehensive Action Program Robert I. Strand, U.S. Bureau of Reclamation, Engineering and Research Center, Denver Colorado, August 1981.
- H. Proposed Trinity River Basin Fish and Wildlife Management Program, Appendix B, Sediment and Related Analysis, Final. Frederiksen, Kamine and Associates, October 1980.

APPENDIX B

DWR-HAMILTON RANCH IRRIGATION SYSTEM



NOT TO SCALE

California Department of Water Resources, Northern District
DWR-Hamilton Ranch
Irrigation Pump and Infiltration Well

INVENTORY OF IRRIGATION, WATER SUPPLY, MISCELLANEOUS EQUIPMENT, AND MATERIALS AT
DWR-HAMILTON RANCH

Irrigation Pump System

<u>Quantity</u>	<u>Item</u>
1	General Electric Verti-Max Induction Motor 30 hp Model 5K284DP5005WA, No. 37481, RPM 3550, Frame L284TP12, Type K, 67.0/33.5 Amp., Code G, 3 phase.
1	Well pump - Peabody Floway, size 8", Type LKL, stages 3, Serial No. 87-30126, HP 30, GPM 325, RPM 3525, T.D.H. 200.
1	Controls Box - Delta Controls, Stockton, CA. 95203, Class 22-103, style C23JE, Cat. No. CR2MCP.
1	Westinghouse Motor Circuit Protector, 100 Amp. CP331000R, 600 v AC 3 pole cu/al.
1	Switch - Telemecanique LCI - D803, base LX6-D40 185, 185v - 50 Hz, 220-240v - 60 Hz.
1	Reset switch - Telemecanique LR-D80 363.
1	Control switch (Hand/Off/Auto) 2 Telemecanique ZB2-BE101.
1	Start Button - Telemecanique ZB2-BE101.
1	Liquid Level Control - Type 1C2DO, Charles F. Warrick Co. 1964 W. Eleven Mile Rd., Berkley, Mich. 48072.
1	2" Rainbird Air Vent Model RB-2AU.
1	Pressure Gage - Rainbird, liquid filled, Model RBG-L160PB.
1	Oil reservoir with ASCO 2-way direct acting solenoid valve, normally closed.
1	24' x 4' diameter CMP well casing, with 3/8" dia. perforations on 6" centers, first 8 feet.
1	90' 6' chainlink fence, with double drive gate, wood stain slats, and 3 strand barbed wire top.

Overhead Tank Truck
Fill Stand pipe

<u>Quantity</u>	<u>Item</u>
1	9' 10" above ground, inside diameter 4", outside diameter 4-1/2"
1	Gate valve 4-1/2" brass. Made in Italy, no brand name noted.

Sprinkler System

42	1" x 12" riser #5
45	1-1/4" Square head pipe plugs
40	Impulse sprinkler heads Rainbird Model 14070 with 1/8" and 1/4" nozzles
5	3" T male to two females
3	3" T female to one male and one female
11	3" end plugs
4	3" 45 degree elbows
87	3" x 30 foot pipes
2	3" x approx. 10 foot pipes
27	6" x 30 foot pipes
2	6" end plugs
31	6" clamps
1	6" male x 4" male x 6" female T
1	6" 90 degree elbow male to female
1	4" male x 6" male x 6" female T
2	4" to 3" x 3/4" valve #2 VO 4333
2	4" clamps
2	10" x 14 foot pipes (one is split)
1	10" x 30 foot pipes
1	8" x 22 foot pipes
1	8" x 30 foot pipes

Ranch Ditch Lining

122	15" x 20' ADS Dualwall Drain Pipe 1565AA
	This includes 7 lengths on Coffin's property near his driveway and 1 above his house, an additional 5 links line a section near the Coffin/Knolden property boundary.
3	15" x 10' ADS Dualwall Drain Pipe 1565AA
106	15" clamps # M294
16	15" x 15" x various sizes T # 1547AA risers

15" ADS Dualwall Drain Pipe 1565AA in storage

7 15" x 20 foot pipes
1 15" x 8 foot pipe
6 15" x 15" pipe
12 15" split couplers #M294
19 12" caps #1032

Orchard Ditch Irrigation System

1 Ditch pump Franklin Electric 1 hp motor Model 11035416 on Berkeley Pump model 10DB.
1 82 gallon galvanized tank
1 Steveco 1/2 hp motor on unknown brand pump, not currently in use.
1 National 120 gallon air capture tank, not currently in use.

Aluminum Irrigation Pipe

8 10" x 30' pipe with circle lock connectors at Knolden/ /Coffin diversion.

Domestic Well and Water Treatment System

1 Well pump Jacuzzi, Model B- 130528-22
1 Pump motor Model 1Rm2-S/A Ser. #4F7088146
1 Chem Feed pump Model #C-1530LP Ser. #JY1475
1 Bruner Water Filter Model #F10 Ser. #255491
1 Red Jacket 82 gallon galvanized tank Model Q82VW
1 250 gallon galvanized "Contact" - tank brand name unknown

Miscellaneous

1 Unassembled steel building, size undetermined, 8' x 8' estimate

Corrugated Metal Culvert

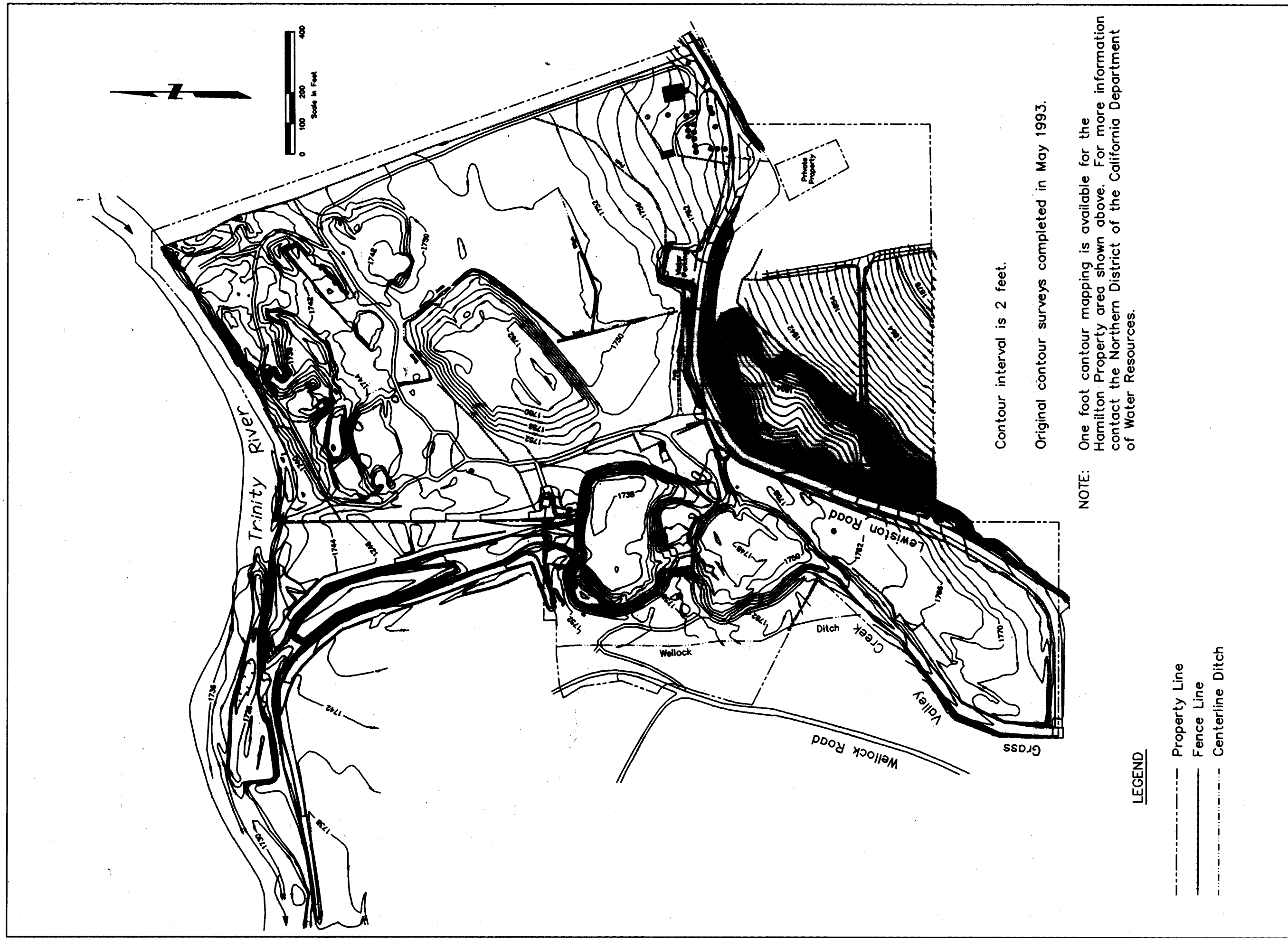
1 36" x 20' good condition (connected to next item)
1 36" x 10' good condition
1 36" x 10' poor condition - bent, has hole
3 36" X 20' poor condition - bent, one with hole
1 24" x 20' poor condition - bent
1 48" x 20' excellent condition - has fish baffles
1 2 piece Hugger Band 48"
2 1 piece band 12"
1 1 piece band 24"
2 1 piece band 36"

APPROXIMATE LENGTH OF RANCH DITCH

	<u>Lined with 15" ADS Pipe</u>	<u>Unlined</u>	<u>Total</u>
Diversion to DWR West Property Line	260	2290	2550
DWR West Property Line to Upper Terrace Access Road	680	0	680
Upper Terrace Access Road to Turnout Box	1500	0	1500
Turnout to DWR East Property Line	<u>0</u>	<u>380</u>	<u>380</u>
Total	2440	2670	5110

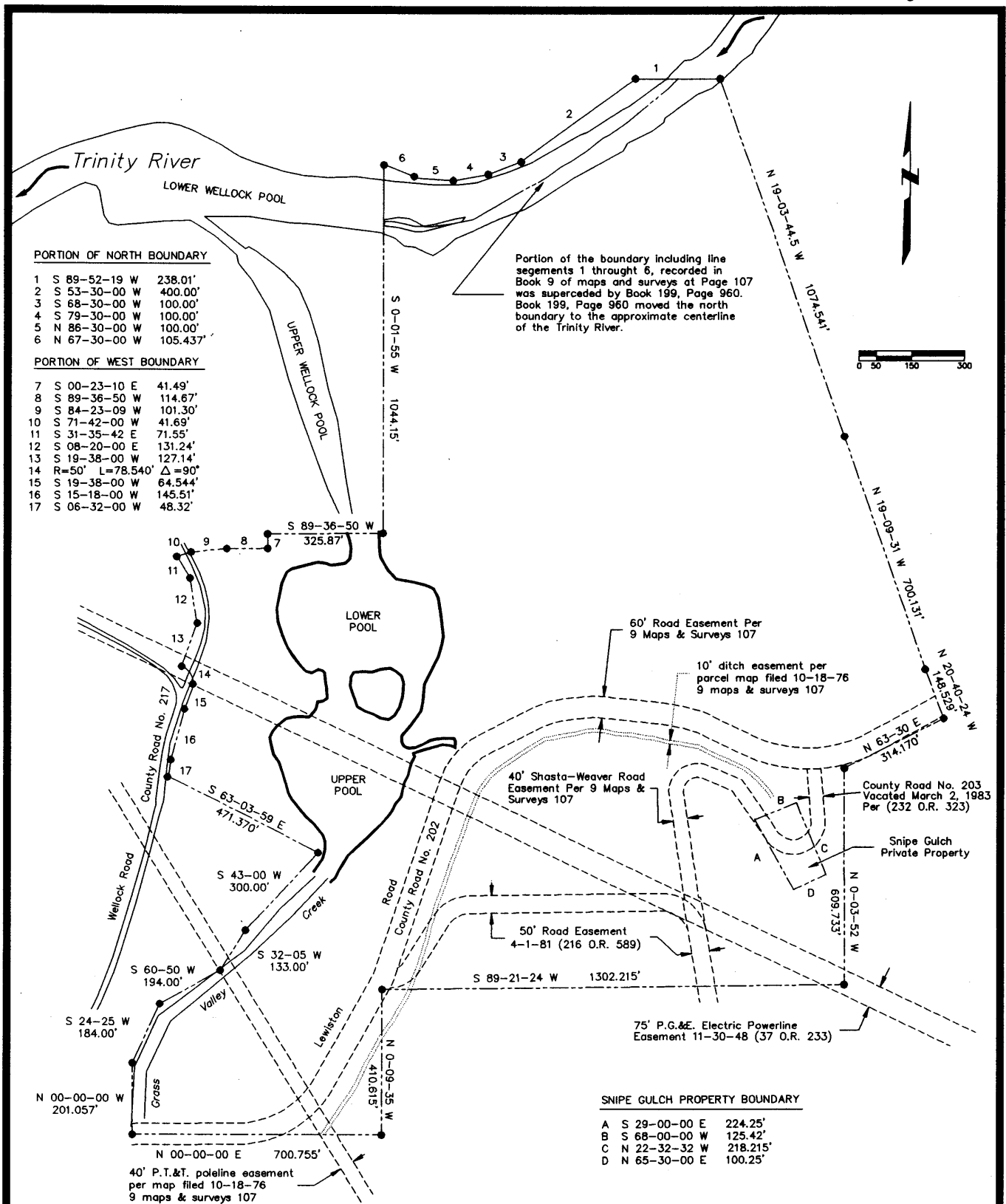
APPENDIX C

MAPS



California Department of Water Resources, Northern District
DWR-Hamilton Ranch
Contour Map with Major Features

Figure C-2



California Department of Water Resources, Northern District

DWR-Hamilton Ranch

Recorded Property Boundary And Easements

APPENDIX D

PERMITS

APPENDIX D

PERMITS

Permits required for work on the Hamilton Ranch and at other sediment control system project sites.

- A. U.S. Corps of Engineers Permit. The Field Office was issued an areawide permit to cover restoration project activities. Dredging was included. Annual work requires notification to USCE by certain dates. The Trinity River Basin Field Office in Weaverville has the permit.
- B. Regional Water Quality Control Board. DWR sends RWQCB a descriptive letter containing location maps and project drawings explaining the work and requesting a waiver of water quality reporting requirements. The Board can then issue a waiver, usually conditional on not getting any complaints from the public. During some projects the Board has requested monitoring of upstream and downstream turbidity.
- C. DFG. A "1601" or Stream Bed Alteration Permit is necessary to do any construction work in or near a stream. This includes dredging and diversion structures. A fee is required. In the past, upon written request DFG has waived the fee for DWR since DFG is partially funding the restoration work.
- D. State Reclamation Board. Does not have jurisdiction on the Trinity River.
- E. State Water Resources Control Board, Division of Water Rights. Reports of surface water use are required by State law. Diversion water use during the past three years is reported on a SWRCB form. The reports for 1986 through 1989 are included in Appendix E.
- F. County of Trinity. Government agencies are not required to get a County Use Permit. An Encroachment Permit was issued to DWR for constructing the driveway at the public parking area on Lewiston road. The County also required signs and flaggers on Browns Mountain Road during sediment excavation of Bucktail Hole. The county road department should be consulted prior to beginning any project that might impact the roads and traffic flow.
- G. Federal Agencies. Projects that use federal lands for access, sediment disposal, or dredging require permits from the agencies managing the land. Past projects have required permits from BLM and USFS. Contact the agency involved.

- H. Access on private lands. For dredging at the SP-BLM pool, permits were required from the Southern Pacific Land Company in addition to BLM. At the Ponderosa Pines pool, temporary entry permits were signed by the landowners involved. Access to both sites required temporary entry permits from about 18 owners and any lessees of land along the Ponderosa Pines subdivision access road. This usually requires promises to repair the access road. Figure D-1 is an example of a typical temporary entry permit. Access to the SP-BLM pool also requires permits from all 27 joint owners of the House Of Mason Property.

Access and disposal of sediment at other dredging sites required temporary entry for both properties traveled across and for parcels where sediment was deposited.

Access to pools at the mouth of GVC required a paid lease. State laws required an assessment of the value of the land to actually be used, not the entire property. The compensation paid was based on a percentage of the appraisal.

- I. Permission to access DWR-Hamilton Ranch for work or for removing surplus material is provided by a temporary entry permit. An example of a permit issued to Trinity County for dredging the upper pool in 1992 is shown in Figure D-2.
- J. State Lands Commission. The Commission regulates lands under waters of the State of California. It previously has not actively exercised jurisdiction in the Trinity Basin. Since the Trinity is considered a navigable waterway, this situation could change.

If in the future, a project is determined to be on land under SLC jurisdiction, DWR will use the 1979 "Memorandum of Understanding" between SLC and DWR. This MOU is for work related to the combined State Water Project and Central Valley Project. Since the restoration is mitigation work for CVP, the MOU will apply. Terms of the MOU require DWR to give SLC a 90-day notice of work to be done on SLC jurisdictional areas using a special form. The MOU and the form are included as Figures D-3 and D-4.

FIGURE D-1

EXAMPLE OF TEMPORARY ENTRY PERMIT FOR ACCESS TO
PRIVATE PROPERTY

- ☐ Exploration
☐ Survey
☒ Construction

District: Northern
Feature: Temporary Access

Permit/Pcl. No.: 025-660-_____

TEMPORARY ENTRY PERMIT

Permission is hereby given to the State of California, Department of Water Resources and its officers, employees, agents and persons under contract therewith, hereinafter referred to as the State, to enter, with all necessary equipment, upon property in the County of Trinity, State of California, described as:
Por. NE $\frac{1}{4}$ Section 27, Township 33 N, Range 9 W, Assessor Parcel No. _____,
Owned by _____

for the purpose of access for excavating a sediment control pool in the Trinity River and surfacing the access road for dust control

and for such other purposes as may be incidental thereto subject to the following provisions:

1. Reasonable precautions will be exercised to avoid damage to persons and property.
2. Permittee assumes no liability for loss or damage to property or injuries to or deaths of agents, contractors or employees of State by reason of the exercise of privileges conferred herein.
3. Nothing in this permit shall preclude Permittee from filing with the State Board of Control a claim, or claims, for any loss or expense which Permittee or his tenant may suffer caused by or arising out of the exercise by the State of the rights herein granted.
4. State agrees to indemnify and hold harmless Permittee from any damage caused by State's authorized use of said property. State agrees also to either indemnify Permittee for any damage or destruction to its roads and fences, or other property, occurring by reason of the exercise of rights granted herein, or to replace or restore said property.
5. This permit will expire on _____.
6. This permit is granted subject to the provisions set forth above.

Dated: _____

Permittee _____ Owner _____ Lessee _____

Acceptance Recommended _____

Land Agent

Permittee's Address

and Telephone

PERMIT ACCEPTED:
State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

By _____

FIGURE D-2

EXAMPLE OF TEMPORARY ENTRY PERMIT FOR ACCESS TO
THE DWR-HAMILTON RANCH

District: Northern
Feature: Suction Dredging Project
Permit Number: 92-1

TEMPORARY ENTRY PERMIT

The State of California, Department of Water Resources, hereinafter referred to as the State hereby gives permission to Trinity County and its officers, employees, agents and persons under contract therewith, hereinafter referred to as the Permittee to enter, with all necessary equipment, upon property in the County of Trinity, State of California, described as: A portion of N 1/4, Section 26, T33N, R9W, MDBM, Assessor Parcel No. 25-180-7, owned by the State of California, for the purpose of Suction dredging decomposed granite sand from the DWR Upper Sediment Control Pool, and for such other purposes as may be incidental thereto subject to the following provisions:

1. Reasonable precautions will be exercised to avoid damage to persons or property.
2. State assumes no liability for loss or damage to property or injuries to or deaths of agents, contractors or employees of the Permittee by reason of the exercise of privileges conferred herein.
3. Nothing in this permit shall preclude the State from filing a claim, or claims, for any loss or expense which the State or its tenant may suffer caused by or arising out of the exercise by the Permittee of the rights herein granted.
4. Permittee waives all claims against State, its officers, agents and employees, for loss or damage caused by, arising out of, or in any way connected with the exercise of this Permit, and Permittee agrees to save harmless, indemnify and defend State, its officers, agents and employees, from any and all loss, damage or liability which may be suffered or incurred by State, its officers, agents and employees caused by, arising out of, or in any way connected with exercise by Permittee of the permission hereby granted, except those arising out of the sole negligence of State.
5. The term of this permit is for a period of one year commencing with the date hereof.
6. This permit is granted subject to the provisions set forth above; EXHIBIT A, a location map; and to provisions 1 through 6 set forth in EXHIBIT B and made a part of this permit.

PERMIT ACCEPTED BY:

Date: 8/24/92
Signature: Tom Stokely
Name: Tom Stokely
Title: Associate Planner
Agency or Company: Trinity County Planning
Address: P.O. Box 2490
Weaverville, CA 96093-2490
Phone: 916-623-1351

PERMIT GRANTED BY:

Date: August 12, 1992
Signature: Ralph N. Hinton
Name: Ralph N. Hinton
Title: Environmental Program Mgr. 2
CA Department of Water Resources
P. O. Box 607, 2440 Main Street
Red Bluff, CA 96080
Phone: (916) 527-6530

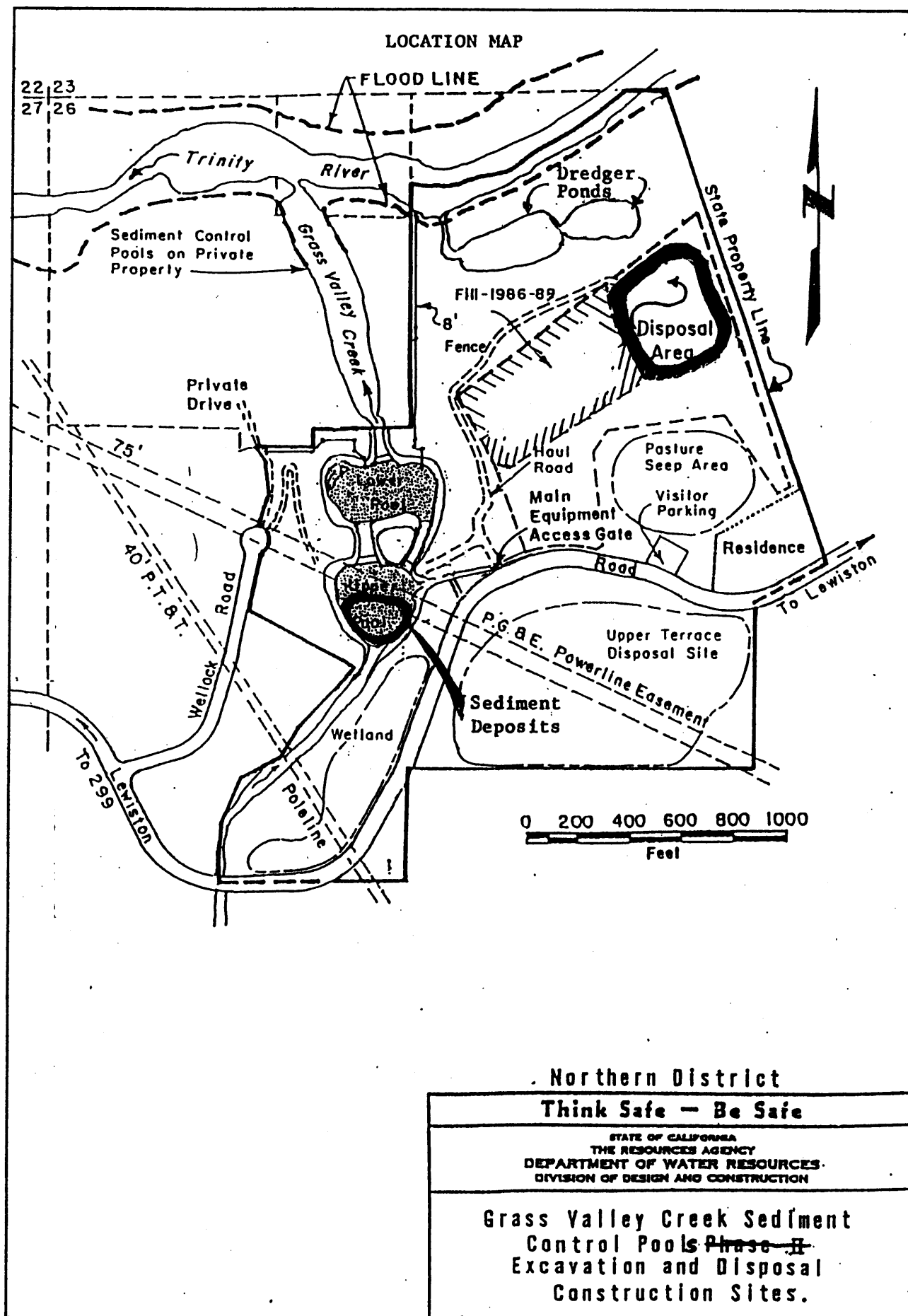


EXHIBIT B - Temporary Entry Permit 92-1

1. The Permittee will prevent creation of dust due to construction activities at all times. This will require watering roads and excavation areas. Water at no charge is available from Grass Valley Creek or from an on site tank truck fill station.
2. Hours of Operation: Motorized equipment will not be allowed to operate before 7 a.m. or after 5:30 p.m.
3. Days of Operation: Work be allowed on Monday through Friday. No work will be allowed on weekends or public holidays.
4. The Permittee will post equipment crossing signs on Lewiston Road and provide for traffic control as needed for safe operation.
5. Disposal of dredged material will be the responsibility of the Permittee, and will be accomplished within 90 days after removal from the pond.
6. The Permittee will notify the State at least 24 hours in advance of the beginning and ending of the construction work. The contact person is John M. Elko, telephone (916) 527-6530.

MEMORANDUM OF UNDERSTANDING
BETWEEN THE
STATE LANDS COMMISSION
AND THE
DEPARTMENT OF WATER RESOURCES
FOR THE USE OF STATE LANDS
FOR FACILITIES OF
THE CENTRAL VALLEY PROJECT AND
THE STATE WATER RESOURCES DEVELOPMENT SYSTEM

The State Lands Commission (SLC) and the Department of Water Resources (DWR), in order to assure proper coordination in the process of DWR project formulation, authorization, construction and operation within the Central Valley Project (CVP) and the State Water Resources Development System (SWRDS), consider it desirable to agree upon a procedure to be followed when DWR facilities for said projects are proposed to be constructed on State lands. The parties therefore agree as follows:

I. General Understanding

Maximum coordination between SLC and DWR is necessary to achieve responsible management of the State's land and water resources.

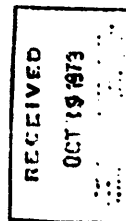
II. Specific Objectives

SLC and DWR by this understanding will reduce potential conflicts between DWR activities in the CVP and SWRDS and other necessary uses of State lands in those areas.

III. Procedures

The following procedures will be followed by the parties to this memorandum with respect to DWR projects on State lands which are included in the scope of Water Code Sections 11130, 12931, and Public Resources Code Section 6327:

1. As provided by paragraph III, 4, below, DWR will involve SLC in the planning and project formulation process, along with representatives of other local, state, and federal agencies, within any administrative and legal constraints, in order to accomplish a total public involvement in DWR programs which affect State lands.
2. For activities undertaken pursuant to this Agreement, DWR will act as the lead agency and be responsible for coordinating all input required under NEPA or CEQA.
3. Comments prepared by SLC and other local, state, and federal agencies will be considered by DWR in the development of final plans for projects which will use State lands.
4. Except for emergency projects, DWR will submit to SLC, at least 90 days prior to use of State lands or the start of construction of a facility on State lands, a "Notice of Proposed Use of State Lands". This notice will include,



(a) a general plan of the facility to be constructed; (b) if available, specific right of way maps and legal descriptions of State lands DWR proposes to use for the facility; (c) the proposed operational criteria for the project; and (d) the expected duration of the use of the State lands affected by the project.

For emergency projects DWR will notify SLC of all emergency actions and, if feasible, such notice will be provided prior to such actions. Such notice will describe the nature of the emergency, the action to be taken, or the facility to be constructed, the State lands affected, and the expected duration of the emergency use. For the purposes of this Agreement "Emergency" is defined as an unforeseen condition or circumstance which calls for immediate action to protect life or property. It includes but is not limited to circumstances resulting from earthquake, flood, and drought.

5. SLC will review DWR's notices submitted pursuant to paragraph 4 above and within 30 days advise DWR of any known, existing, or proposed facilities which may be in conflict with DWR's planned use. SLC will also recommend to DWR any restrictions of limitations on

DWR's use of the State land which it deems necessary for the health and safety of the public and preservation of the public trust or preservation of natural resource values and protection of the environment.

IV. Cooperation and Periodic Review

SLC and DWR agree that they will cooperate and mutually assist each other in all appropriate ways necessary to promote maximum effectiveness of the foregoing procedures. Periodically, the parties will review the procedures and consider revisions as desirable to promote the objectives identified in the memorandum.

V. Retained Leasing Power

DWR agrees that SLC may retain the authority to lease any land that is the subject of this agreement on the condition that said leasing is made after due notice to DWR and is not incompatible with the use to be made by DWR. DWR and its agents, contractors and cooperating entities may use the land as agreed but may not allow other public or private entities to use the land or facilities, described in this agreement, for purposes other than those included under Section 11130 and 12931 of the Water Code, without the consent of SLC.

NOTICE OF PROPOSED USE OF STATE LANDS

This notice is provided pursuant to the terms of the Memorandum of Understanding, dated October 19, 1979, between the Department of Water Resources and the State Lands Commission. It is intended for use where State Lands are used for either the Central Valley Project or the State Water Resources Development System.

NOTICE FROM DWR

A. PROJECT LOCATION:

Project Title Upper Sacramento River Spawning Gravel Restoration Project
County Shasta Nearest City Hadding Distance 0 to 1 mile
(Project to Nearest City)
Direction of city from project Within Waterway involved Sacramento River
Attached are (check one or both): Right of Way Map Legal Description

B. PROJECT DESCRIPTION AND OPERATION (Brief description of project and facility, anticipated duration of use, proposed disposition of facility at termination, and effect on water levels or flows):
DWR will place 100,000 cubic yards of 1/2 inch to 4 inch spawning gravel
in the Sacramento River to provide urgently needed spawning habitat for
anadromous fish, including the threatened winter run chinook salmon.

C. Project is part of: Central Valley Project, State Water Resources Development System

D. List Environmental Documentation either planned or completed: Initial Study
and Negative Declaration (attached) Date of final Report June 30, 1990
E. Attach drawings of project facility.
Submitted by John Elio Phone 527-6530 Date June 20, 1990 Approved _____
Final DWR Completion Notice provided: Anticipated by end of June, 1990
(month/day/year)

SLC RESPONSE

A. PRELIMINARY (Date _____):

Existing or proposed projects located within project area (attach maps if necessary):

Recommended restriction or limitations: _____

B. FINAL SLC ACTION (Date _____):

Submitted to Commission on: _____ Calendar Item _____

Action Taken _____

Negotiator _____ Phone _____ Approved _____

VI. Liability for Damages or Injury

DWR hereby agrees to indemnify and hold SLC harmless from liability for property damage or personal injury arising from DWR's design, construction, and operation of activities on State lands pursuant to this memorandum and from the acts of DWR's employees, agents and contractors, excepting any damage or injury caused by the negligence or willful misconduct of SLC and its employees, agents, or contractors.

Dated: October 19, 1979

STATE OF CALIFORNIA
STATE LANDS COMMISSION

William Northrop
WILLIAM NORTHROP
Executive Officer

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

Ronald B. Robie
RONALD B. ROBIE
Director

Approved as to local form
and sufficiency:

John Elio
John Elio
of Water Resources

APPENDIX E

WATER RIGHTS INFORMATION

APPENDIX E

WATER RIGHTS INFORMATION

1. Letter to Alan Davis requesting information on DWR rights to use a water diversion ditch.
2. Response to above letter.
3. Excerpts from DWR Bulletin 94-2.
4. Reports of 1990 through 1992 water use.

August 28, 1992

Allan Davis
Land and Right of Way
Room 431-8

John Elko, 446-2375
Northern District

Rights to Convey Water Across Private Property
Using State Diversion Ditch

DWR purchased 90 acres of property in Trinity County near Lewiston in 1985 to construct a sediment control project in the Grass Valley Creek Drainage. Grass Valley Creek is tributary to the Trinity River, and contributes most of the decomposed granite sand that has damaged the Trinity River fishery below Trinity Dam.

One feature of the sediment control project is storage of material dredged from sediment trap ponds. The spoil material will be planted and irrigated to use for wildlife habitat.

A source of water for the irrigation is a diversion from GVC. An existing diversion ditch, probably constructed in the mid 1800s crosses two private parcels (Knowlden and Coffin) to the south of the State land. This ditch requires construction and removal of a diversion structure on the Knowlden property each year it is used. Part of the State ditch on the Coffin property has been used this year by sharing water from the Coffin diversion further upstream, but the State diversion and ditch on the Knowlden property has not been used for 4-5 years.

Mrs. Knowlden told us her realtor said she can fill in the ditch if it is not used within a certain number of years. We need to find out: 1) What our rights are regarding access to the diversion site and to the ditch, 2) required frequency of use (if any) of the ditch to preserve our rights, 3) what our recourse is if the ditch is filled by the property owner.

Table 1 contains information about the properties concerned. A copy of the Trinity County Assessor map has the properties outlined, and shows the approximate locations of the diversion ditches.

Allan Davis
August 28, 1992
Page 2

Northern District is preparing a Management Plan for the DWR-Hamilton Property. This report must be completed before the end of September, when federal funds run out, so it is necessary to finish the determination before then.

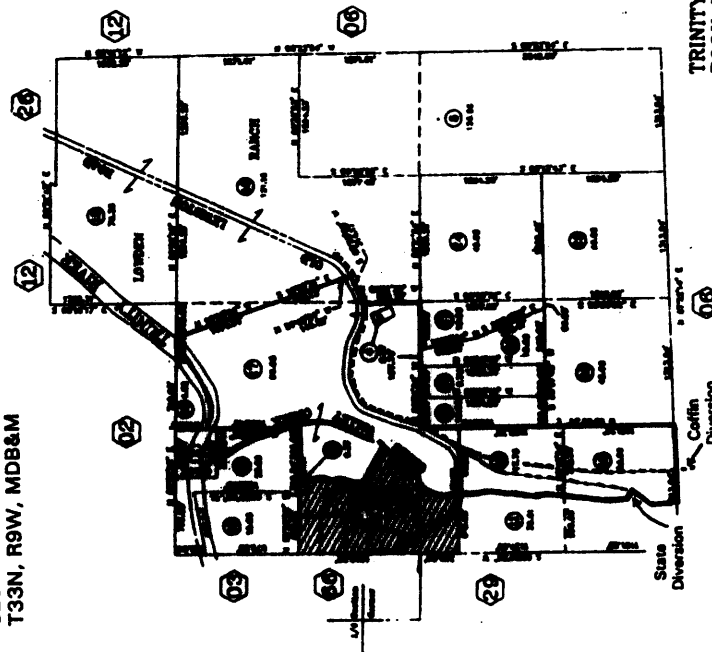
We understand that a title search of the two private parcels will be necessary at a cost of about \$600-800. Please call me with a cost estimate, to cover DWR and outside charges. A DWR 1498 will be issued to cover the work. The work authority to use is 0850-0002.

If you need more information, please call me at CALNET 8-446-2375.

Enclosures

B:\DAVIWATE.WP5
JELKO:LMILES

SEC. 26 & PART OF SEC. 23,
T33N, R9W, MDB&M



25-180
T.A.C. 63-001

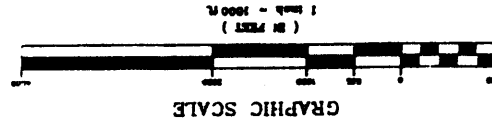


Table 1

	DWR-Hamilton Ranch	Coffin Property	Knowlden Property
Location	T33N, R9W, S23 MDB&M	T33N, R9W, S23 MDB&M	T33N, R9W, S23 MDB&M
Assessor NR	025-180-017	025-180-12	025-180-11
DWR Parcel No.	TRI-16		
Owners name	State of CA	Donald L. and Monica L. Coffin	Gary L. Knowlden Trust (Gary and Maggie Knowlden)
Address	P.O. Box 388 Sacramento, CA 95802	Star Rt Box 87 Lewiston, CA 96052	P. O. Box 605, Lewiston, CA 96052
Telephone	(916) 653-5712	(916) 776-3696	(916) 778-3457
Feature	Irrigation use	Diversion ditch	Point of diversion, diversion ditch

TRINITY COUNTY ASSESSOR'S OFFICE
BOOK TWENTY-FIVE, PAGE EIGHTEEN
AUGUST 8, 1994

OFFICE MEMO

TO: John Elko

DATE: December 11, 1992

SUBJECT: Water Rights and
Easement Rights for Hamilton
Ranch -- Parcel No. TRI-16

FROM: Ward Tabor

Privileged Communication: Attorney-Client

This responds to your August 28, 1992 memorandum in which you asked for an opinion on the following:

Issues:

1. What is the nature of the Department's water rights and easement rights to use the Knowlden and Coffin Ditches for diversions from Grass Valley Creek?
2. What is the required frequency of use in order to preserve the Department's rights?
3. What rights does the Department have with respect to the owners of the land where the ditches are located?

Conclusions:

1. The Department has at least three types of water rights: (a) riparian; (b) pre-1914 appropriation; and (c) groundwater. The pre-1914 right is dependent upon the fact that there has been no five-year period of non-use. The Department owns express appurtenant easements to certain ditches, which can be lost only by abandonment.
2. The Department should exercise its pre-1914 rights by use at least once every five years and should timely file Statements of Water Diversion and Use; and
3. The Department should send a letter to adjoining landowners (Knowlden) specifying our rights.

Facts:

In 1985, DWR purchased approximately 90 acres in Trinity County near Leviston for the purpose of constructing a sediment control project in the Grass Valley Creek drainage, known as Hamilton Ranch. Grass Valley Creek is a tributary to the Trinity River and a portion of the Hamilton Ranch boundaries consist of these two water courses.

The Department's grant deed from Ruth V. Hamilton, dated October 23, 1985 and recorded December 23, 1985, includes the following specific language:

"together with all of the Grantor's right, title and interest in and to all water and water rights, whether surface or subsurface, or of any other kind, including all appurtenant water and water rights, and all water and water rights in any way incident to the real property herein described, or used thereon or in connection therewith, and all other appurtenant rights and easements pertaining to said real property."

On September 14, 1953, a predecessor-in-interest to Hamilton was granted certain water rights and easement rights relative to Ranch Ditch (or Lowden Ditch) (deed recorded October 2, 1953 at Book 53, page 245). The specific language of the deed is as follows:

"TOGETHER with any and all water, water rights, ditch and ditch rights used on or in appurtenant [sic] to the above described property. Especially the undivided 1/2 interest in and to, that certain water ditch situated in the Lowden Ranch Mining District known as and called the "RANCH DITCH" or "LOWDEN DITCH". Also an undivided 1/2 interest of, in and to the water right of 120 inches of water measured under a four inch pressure appurtenant to said ditch."

On April 8, 1957, this same predecessor-in-interest was granted by deed a right-of-way for the Sutton & Norris ditch (recorded May 22, 1957 at Book 69, page 178). The granting clause of that deed provides in pertinent part:

"... a right of way ten (10) feet in width to construct, maintain and use an existing open ditch, known as the Sutton & Norris or Paulsen Ditch, for the conveyance of water on, over and through the following described property...."

1. One of the exclusions to the title insurance policy obtained for the acquisition (Guarantee No. 33078) is the following general exclusion:

"The company assumes no liability for loss or damage by reason of the following:

* * *

water rights, claims or title to water."

2. This deed contains the following conditions:

- a. "[that grantees] will not interfere with or diminish the normal flow of water now being diverted by the above named grantors from Grass Valley Creek into that certain ditch known as the Ohio ditch;
- b. "[that grantees] shall not interfere with or disturb an existing 1" pipeline crossing said Sutton & Norris or Paulsen ditch to a spring on the above named grantors property adjacent to and alongside of said ditch; and
- c. "that the above described right of way and easement and ditch shall be used by the grantee herein . . . solely for

In 1987, DWR filed Statements of Water Diversion and Use for 1986: (1) riparian rights with use dating from 1986; and (2) pre-1914 rights dating from 1852.³ A review of the Water Rights Notice records of the State Water Resources Control Board for riparian and pre-1914 appropriative rights revealed no other such rights on Grass Valley Creek. A review of the Board's records on licenses and permits (post-1914 rights), revealed two active rights on Grass Valley Creek: (1) Wellock (License No. 9462, with a priority date of February 23, 1966); and (2) U.S. Bureau of Reclamation (Permit No. 18873, with a priority date of October 19, 1978) for the Buckhorn Debris Dam, approximately five to ten miles upstream.

Apparently, a dispute has arisen with the owners of one of the servient estates (Knownen property) who have, at least by implication, threatened to fill in the ditch.

Analysis:

A. Water Rights

1. Pre-1914 Rights

a. Creation

Pre-1914 appropriative rights were created in either of two ways: (1) nonstatutory prior to adoption of the Civil Code in 1872 and (2) pursuant to the 1872 Civil Code. Hutchinson, California Law of Water Rights, p. 86 (1956). Assuming that water was diverted from Grass Valley Creek for use on the Hamilton Ranch in 1852, then the water right would have been initiated by a "visible act and avowed intent," including the actual construction of works. *Id.* at 87-88. Title to the right vested at least by the date water was put to a beneficial use. *Id.* at 110. In contrast to riparian rights, appropriative rights may be conveyed separate from the land, *Id.* at 125, but generally the right becomes appurtenant to the land, in the nature of an easement. *Id.* at 124. Where water has been appropriated for use upon certain land which cannot be advantageously used without it, the water right passes in a conveyance of the land as an appurtenant right. The right is limited to the amount of water actually put to a beneficial use. *Id.* at 135.

An appropriator claiming under pre-1914 rights need not obtain permission from the SWRCB to change purpose of use, place of use or point of diversion. Water Code § 1706; *see also* Code Commission Comments under Water Code § 1700.

the purpose of conveying water to the property owned by the said grantees . . ."

3. Upon review of the Land & Right-of-Way files of the land agent and the appraiser for the Hamilton Ranch acquisition, I found no references to water rights of any kind related to Grass Valley Creek or the Trinity River. In other words, the Department's water rights apparently may have been neither an issue nor an element of valuation.

b. Abandonment or Non-Use

Appropriative rights may be lost by abandonment. There must be an intent and actual relinquishment of possession to constitute abandonment. Hutchins, p. 286. Mere nonuse is not enough, but non-use may raise rebuttable evidence of abandonment.

In addition appropriative rights may be lost by non-use for five years. *Id.* at 291-92; *Smith v. Hawkins* (1995) 110 Cal. 122, 127; *Crane v. Slavinson* (1936) 5 Cal.2d 387, 396. An inability to obtain water because of a natural shortage does not of itself cause a forfeiture. *Huffman v. Savday* (1908) 153 Cal. 86, 92. Upon forfeiture for non-use, the right ceases to exist and "such unused water may revert to the public and shall, if reverted, be regarded as unappropriated public water." Water Code § 1241. A party who bases his right upon the forfeiture of a prior right has the burden of proving that such forfeiture has taken place. *Lema v. Ferraki* (1938) 27 Cal.App.2d 65, 73.

When the validity of a pre-1914 appropriative water right is disputed, evidence of both the original appropriation and the subsequent maintenance of the right by continuous and diligent beneficial use of the water must be shown. Water Code 1202(b); SWRCB, Information Pertaining to Water Rights in California, p. 1 (1990). This evidence may consist of oral testimony of persons who have actual knowledge of the relevant facts. An evidentiary record of water use can be established by filing Statements of Water Diversion and Use with the SWRCB.

We should consider whether it may be worthwhile to establish a record of use since 1914. The risk of relying on a pre-1914 right is that we do not know whether there has ever been a five year period of non-use.

2. Riparian Rights

Riparian water rights exist by virtue of ownership of land abutting upon a stream or body of water, but afford no basis for a right to use such water upon nonriparian lands. *Rancho Santa Margarita v. Vail* (1938) 11 Cal. 2d 501, 530. In order to divert water under a riparian claim, the diverter must use it on riparian lands but need not own the land at the point of diversion, such as an upstream point. *Turner v. James Canal Co.* (1909) 155 Cal. 82, 92. A riparian owner has a right of reasonable use of the water on the owner's riparian land, but is subject to the common right of all riparian owners to a reasonable share of the water. *Id.* at 94-95; Hutchins, p. 183-84. The riparian right is neither created by use nor lost by nonuse. *Parker v. Swatt* (1922) 188 Cal. 474, 480; Hutchins, p. 182.

Land to which riparian rights attach must be contiguous to or abut the stream, except in those cases where the right has been preserved in parcels that have become noncontiguous through subdivisions. *Rancho Santa*

4. As the years pass, oral testimony, dependent upon the recollection of individuals, may become difficult or impossible to secure. At least a partial remedy for this situation may be the procedure for the perpetuation of testimony in Code of Civil Procedure § 2017.

Margarita, 11 Cal.2d at 528-29. In order to be considered riparian, the land must be within the watershed of the stream. *Id.*; Hutchins, p. 197. One issue raised by Julie Laudon, Engineering Geologist with the SWRCB, was whether use within the watershed of Snipe Gulch, as it appears on the Statement of Water Diversion and Use, was truly riparian use. If a tract of land riparian to a stream in watershed A extends across the divide into watershed B, the portion lying in watershed B may or may not be riparian to the stream that drains it, but it is not riparian to the stream in watershed A. Hutchins, p. 202. Each tributary is considered a separate stream with regard to lands contiguous thereto above the junction, so that land lying within the watershed of one tributary above that point is not riparian to the other stream. *Anahela Union Water Co. v. Fuller* (1907) 150 Cal. 327, 330-31. However, as against lower riparian owners located below the confluence of a main stream and a tributary, the watershed of the main stream and of the tributary constitute parts of a single watershed. *Crane v. Stevenson* (1936) 5 Cal.2d 387, 399-400. While not absolutely clear from the maps in my possession, it would appear that the land on which DWR has applied water pursuant to its riparian rights (see Statement of Water Diversion and Use No. 12917) may be within the Grass Valley Creek watershed. However, further investigation may be necessary.

A riparian right may be lost by prescription. To establish prescriptive rights to the use of water, the use must have been actual, open, notorious on the part of the adverse claimant; adverse and hostile to the claim of the rightful owner; exclusive; continuous and uninterrupted; under a claim of right, with payment of taxes whenever taxes have been levied on the water right; and must have been made throughout the period prescribed by the statute of limitations (five years). Hutchins, p. 301. If an upstream appropriator, whether or not he owns riparian lands, takes water that may be rightfully claimed by downstream riparian owners or prior appropriators, such taking is a trespass and if allowed to continue may ripen into a prescriptive right. *Id.* at 325. The knowledens, by filling in the ditch and using the Department's water right, might claim the Department lost its rights by the knowledens' prescriptive activities; but, they are unlikely to prevail on such a claim. The Department should not lose its rights through prescription. Civil Code § 1007.

3. Groundwater Rights

According to the appraiser's report for the Hamilton Ranch, there are two 100-foot deep wells, two electric pumps, and a pumphouse. The Department, as an overlying owner, has a legal right to such amount of groundwater as is reasonably needed for beneficial purposes. Proper overlying use is paramount to the right of any appropriator of ground water, who would be limited to any surplus. *Pasadena v. Alhambra* (1949) 33 Cal.2d 908, 925; *see also Los Angeles v. San Fernando* (1975) 14 Cal.3d 199. However, this does not apply to a subterranean watercourse flowing through known and definite channels. The question of whether ground waters are percolating or part of a stream is one of fact. If there are known ground

5. Once a public easement attaches to property, the easement cannot be extinguished as against the State by adverse possession. *People v. Sayig* (1951) Cal.App.2d 890, 898 (easement for highway purposes).

waters, the presumption is that they are not a part of the stream or watercourse nor flowing in a definite channel. Hutchins, p. 427-28. The right of reasonable beneficial use of the overlying owner is correlative in relation to similar rights of all other owners of land overlying the same ground water. In times of insufficiency, the requirements of the overlying owners must be apportioned. *Katz v. Malkinshaw* (1903) 141 Cal. 116, 135-36; Hutchins, p. 431.

B. Easement Rights

1. Rights and Duties in General

Once an easement has been created, both the easement owner and the servient tenant owner have the right to insist that so long as the easement is enjoyed it shall remain essentially the same as it was when the right was created. 5 Miller & Starr, Current Law of California Real Estate (2d), § 15.53, p. 525. The owner of the easement can improve it in any reasonable manner in order to make its use more suitable and convenient so long as the mode of enjoyment does not increase the burden on the servient tenant. *Id.*, § 15.54, p. 526-27. In the absence of a provision regarding the exclusivity of the easement's owner right to use the easement, the servient tenant owner can make any use of the easement that is not inconsistent with and does not interfere with its use by the easement owner. *Id.*, § 15.55, p. 535.

The rights and duties between the owner of the easement and the owner of the servient estate are correlative. Each is required to respect the rights of the other. Neither party can conduct activities or place obstructions on the property which unreasonably interfere with the other's use of the property. *Id.*, § 15.62, p. 556-57. The owner of the servient estate can use the property in any manner and for any purpose which is not inconsistent with and does not unreasonably interfere with the use and enjoyment of the easement. The servient owner can make any changes or improvements which do not interfere unreasonably with the enjoyment of the easement. *Id.*, § 15.63, p. 559. Each easement, regardless of how created, confers upon its owner certain implied secondary easements essential to its full enjoyment, including the right to enter upon the servient estate to maintain and repair the easement. *Id.*, § 15.65, p. 562.

The servient owner has no obligation to repair or maintain the easement unless otherwise specified in an agreement or unless the servient owner also uses the easement. *Id.*, § 15.66, pp. 563, 566. On the other hand, the easement owner has the right and duty to maintain and repair the easement. Civil Code § 845. When more than one party uses an easement, the cost of maintaining and repairing the easement must be shared either pursuant to an agreement or based upon the proportion of use of the easement by each user. *Id.* (c).

The owner of the easement is liable in damages suffered by the servient owner for any wrongful or unreasonable acts on the servient estate. As a public agency, the Department, in inverse condemnation, could be held liable for injuries caused to the servient tenant. *Martin v. San Rafael* (1980) 111 Cal.App.3d 591, 595. On the other hand, any person who interferes with the use of an easement can be enjoined by the owner of the

easement. Civil Code § 809. The owner of an easement can also recover damages. *Moyle v. Dykes* (1986) 181 Cal.App.3d 561, 574.

2. Termination of Easements

Among other ways not relevant here, an easement may be lost by abandonment, when the owner stops using it with the intention of abandoning the right to use in the future. 5 Miller & Starr, § 15.78, p. 592. However, when an easement is created by an express grant, mere nonuse does not terminate the easement. Id. In addition, an easement may be extinguished by the adverse possession of the servient owner if such use satisfies the requirements for adverse possession. In other words, an easement may be terminated if the servient owner occupies the easement area in an open and notorious manner, and uses it under a claim of right which is adverse and hostile to the easement owner for a five year period. Id., § 15.84, p. 612. The owner of an easement can obtain a mandatory injunction prohibiting interference with the use of the easement. Id. The use of the easement area by the servient owner need not be continuous for the five-year period if such conduct is inconsistent with the use of the easement and the easement is not used by the owner during the five-year period. *Masin v. LaMarche* (1982) 136 Cal.App.3d 687, 693-94. However, pursuant to Civil Code § 1007, claims of adverse possession and prescription do not apply to the State.

C. Recommendations

1. Filing Statements of Water Diversion and Use

The Department should continue to file Statements of Water Diversion and Use, as required by Water Code § 5101. Although there is no penalty for not filing the statements (§ 5108), the statements can serve as evidence of use for the purposes of pre-1914 rights. The Department filed statements in 1986 and 1990. Water Code § 5104 requires supplemental statements to be filed every three years, prior to July 1 of the year succeeding the end of each three-year interval. Therefore, the Department should file statements by July of 1993. The statements should continue to claim both riparian rights and pre-1914 rights (the new Statement forms now require such an identification).

The Department should rely both on its riparian rights and its ditch rights (pre-1914 rights) referred to above. The riparian rights are not lost by non-use and so long as the Department exercises the pre-1914 rights at least once every five years, and assuming there has been no non-use for any five year period, the easement rights and water rights should remain valid.

2. Beneficial Use of Water

The Department should exercise its water rights to such an extent as to not lose them. Water used pursuant to any right must be beneficially used, but to maintain any pre-1914 right, we must exercise such rights at least once every five years in order to preserve the water right.

3. Letter to Knowlton

I recommend that the Department write a letter to Knowlton declaring our intention of continued use of the easement and articulating the Department's need for access for repair and maintenance of the easement. If Knowlton or any owner takes action adverse to the Department's interest it is important that action be taken, both by further written communication and lawsuit, if necessary.

cc: Carroll Hamon
Lint Brown
Mike Rumsey
Susan Weber
Katy Striemer
Steve Cohen
John Kramer

C:\WP51\DMR\hamranwt.eas
121192-1450

STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503
(916) 657-1875

GRASS VALLEY CR
DITCH - RANCH
DITCH.

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIVERTER OF RECORD:

STATEMENT NO: 012917

CALIFORNIA DEPT OF WATER RESOURCES

~~P.O. BOX 687~~ 2440 MAIN ST
RED BLUFF, CA 96080

ATTN: JOHN ELKO

TELEPHONE NUMBER:

~~(916) 321-8530~~
916 529-7375

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: GRASS VALLEY CREEK

TRIBUTARY TO: TRINITY RIVER

COUNTY: TRINITY

DIVERSION

WITHIN: SE1/4 OF NW1/4 SECTION 26, T33N, R09W, MDB&M.

INSTRUCTIONS: Please complete Items A, B and C. Item D should be completed if you replaced all or part of your regular water supply with reclaimed or polluted water. RETURN THIS FORM BY JULY 1, 1993. (Additional information on reverse side of this form.)

- A. Amount of Use - Fill in the amount of water used each month. If monthly and annual use are not known, check the months in which water was used.
- Amounts below are: ☐ Gallons ☐ Acre-feet ☐ _____ (other)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
1990						X	X	X	X	X	X		
1991						X	X	X	X	X	X		
1992						X	X	X	X	X	X		

- B. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation 1 ACRES ORCHARD

Stockwatering _____

Domestic _____

Other (specify) 5 TO 10 ACRES OF WILDLIFE HABITAT

- C. Changes in Method of Diversion - Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)

- D. If part of the water listed in Part A consists of reclaimed or polluted water, please indicate the annual amounts of reclaimed or polluted water in the space below.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

DATED: April 9, 1993, at Red Bluff, California

Signature: John Elko

STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
901 P ST. SACRAMENTO, CA 95814
(916) 322-4503
(916) 657-1875

30HP Pump GRASS VALLEY CR

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIVERTER OF RECORD:

STATEMENT NO: 012918

CALIFORNIA DEPT OF WATER RESOURCES
~~P.O. BOX 207~~ 2440 MAIN ST
RED BLUFF, CA 96080

ATTN: JOHN ELKO

TELEPHONE NUMBER:

~~415 527 4550~~
916 529-7375

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: GRASS VALLEY CREEK

TRIBUTARY TO: TRINITY RIVER

COUNTY: TRINITY

DIVERSION

WITHIN: SW1/4 OF SW1/4 SECTION 26, T33N, R09W, MDB&M.

INSTRUCTIONS: Please complete Items A, B and C. Item D should be completed if you replaced all or part of your regular water supply with reclaimed or polluted water. RETURN THIS FORM BY JULY 1, 1993. (Additional information on reverse side of this form.)

Amount of Use - Fill in the amount of water used each month. If monthly and annual use are not known, check the months in which water was used.

Amounts ☐ Gallons
below are: ☐ Acre-feet
☐ (other)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
1990						X	X	X	X	X	X		
1991						X	X	X	X	X	X		
1992						X	X	X	X	X	X		

B. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation 8 ACRES OF PASTURE AND WILDLIFE HABITAT

Stockwatering _____

Domestic _____

Other (specify) DUST CONTROL FOR 12 ACRES

C. Changes in Method of Diversion - Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)

D. If part of the water listed in Part A consists of reclaimed or polluted water, please indicate the annual amounts of reclaimed or polluted water in the space below.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

DATED: 4/9, 19 93, at Red Bluff, California

Signature: John Elko

WR 40-1 (2/89)

2204

1992

STATE WATER RESOURCES CONTROL BOARD

Division of Water Rights

P.O. BOX 2000 SACRAMENTO, CA 95812-2000
 901 P ST. SACRAMENTO, CA 95814
 (916) 322-4903
 (916) 657-1875

SNIPE GULCH DIVERSION

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE

DIVERTER OF RECORD:

STATEMENT NO: 012919

CALIFORNIA DEPT OF WATER RESOURCES

~~P.O. BOX 2000~~ **2440 MAIN ST**
 RED BLUFF, CA 96080

ATTN: JOHN ELKO

TELEPHONE NUMBER:

~~(916) 529-0550~~
916-529-7375

IF NAME/ADDRESS/PHONE NO. IS WRONG OR MISSING, PLEASE CORRECT.

SOURCE: SNIPE GULCH

TRIBUTARY TO: GRASS VALLEY CREEK

COUNTY: TRINITY

DIVERSION

WITHIN: SE1/4 OF NE1/4 SECTION 26, T33N, R09W, M08&M.

INSTRUCTIONS: Please complete Items A, B and C. Item D should be completed if you replaced all or part of your regular water supply with reclaimed or polluted water. RETURN THIS FORM BY JULY 1, 1993. (Additional information on reverse side of this form.)

- A. Amount of Use - Fill in the amount of water used each month. If monthly and annual use are not known, check the months in which water was used.

Amounts ☐ Gallons
 below are: ☐ Acre-feet
☐ _____ (other)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual
1990					X	X	X	X	X	X	X		
1991					X	X	X	X	X	X	X		
1992					X	X	X	X	X	X	X		

- B. Purpose of Use - Specify number of acres irrigated, stock watered, persons served, etc.

Irrigation 1 Acre Domestic Orchard

Stockwatering _____

Domestic _____

Other (specify) _____

- C. Changes in Method of Diversion - Describe any changes in your project since your previous statement was filed. (New pump, enlarged diversion dam, location of diversion, etc.)

- D. If part of the water listed in Part A consists of reclaimed or polluted water, please indicate the annual amounts of reclaimed or polluted water in the space below.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

DATED: 7/9/, 19 93, at RED BLUFF CA, CaliforniaSignature: John M. Elko

WR 40-1 (2/80)

2205

1992

EXCERPTS FROM DEPARTMENT OF WATER RESOURCES

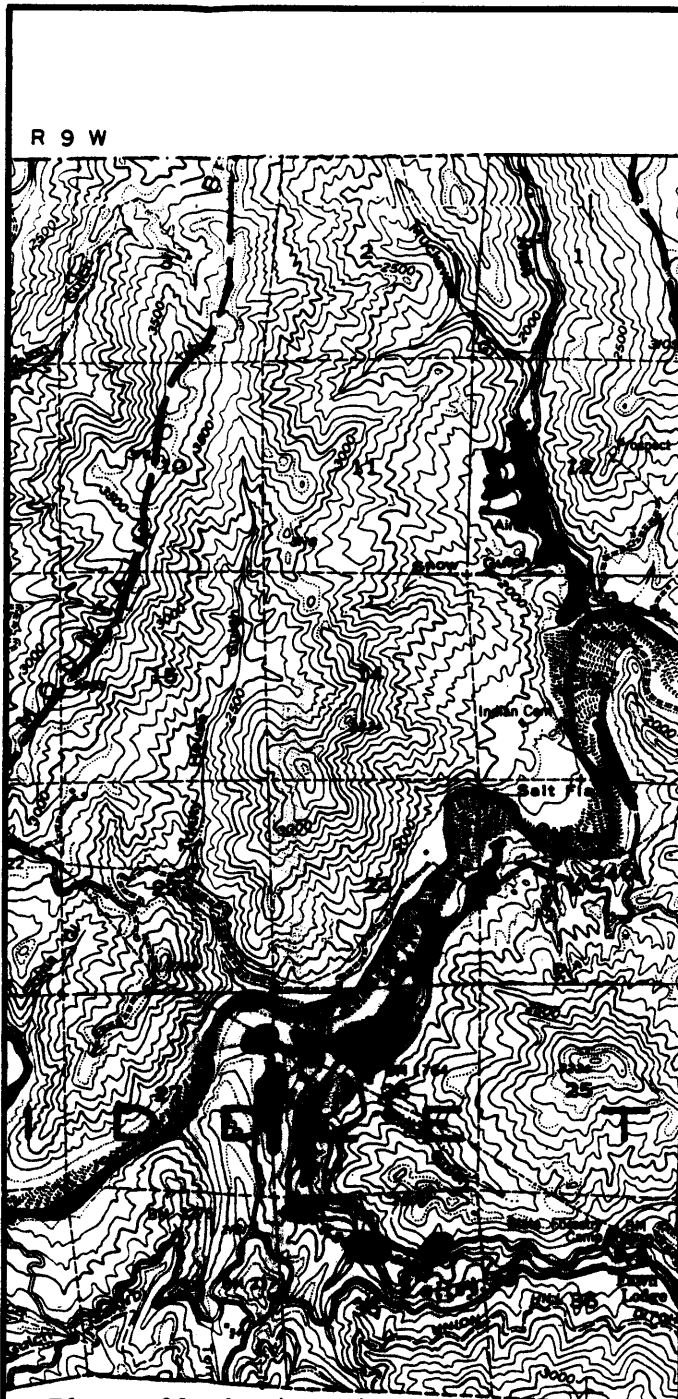
BULLETIN NO. 94-2

LAND AND WATER USE IN

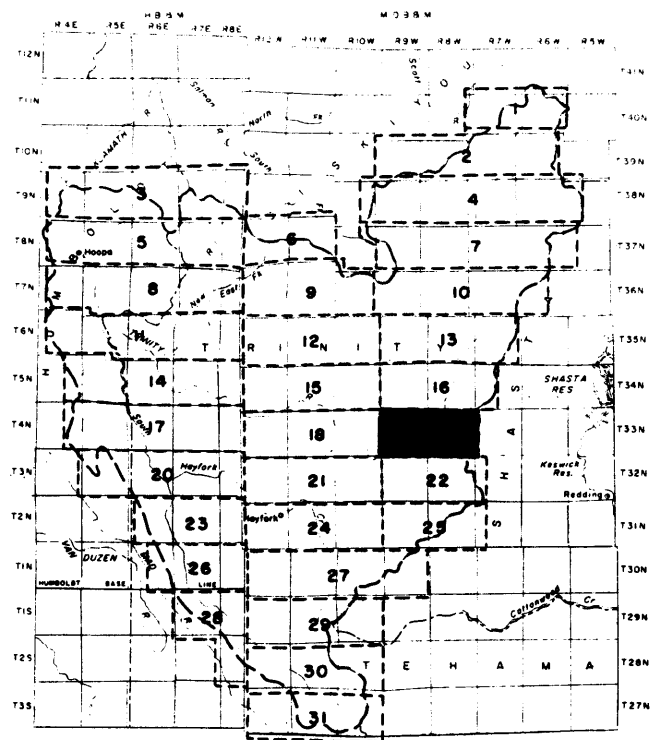
TRINITY RIVER

HYDROGRAPHIC UNIT

VOLUME 1: TEXT



E1 = Wellock Diversion
 C1 = Coffin-Knolden Diversion
 D1 = DWR-Hamilton Ranch, VanZee
 Diversion - Ranch Ditch
 H1 = DWR Upper Terrace

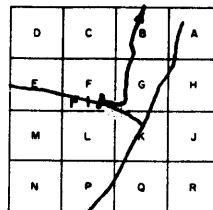


INDEX TO SHEETS



LEGEND	
	GRAVITY DIVERSION
	PUMP DIVERSION
	DIVERSION CANAL OR DITCH
	DIVERSION PIPE
	STREAM GAGING STATION
	POWERHOUSE
	HYDROGRAPHIC UNIT BOUNDARY
	HYDROGRAPHIC SUBUNIT BOUNDARY
	LANDS RECEIVING FULL IRRIGATION
	LANDS RECEIVING PARTIAL IRRIGATION
	LANDS USUALLY IRRIGATED BUT IDLE OR FALLOW IN 1957
	NATURALLY IRRIGATED MEADOWLANDS
	DRY-FARMED LANDS
	URBAN LANDS
	RECREATIONAL LANDS
	RESERVOIR UNDER CONSTRUCTION

KEY TO NUMBERING SYSTEM



DIVERSIONS SHOWN ARE NUMBERED BY TOWNSHIP RANGE AND SUBDIVISION OF SECTION, eg DIVERSION 31N/12W-21F1

STATE OF CALIFORNIA
 THE RESOURCES AGENCY OF CALIFORNIA
 DEPARTMENT OF WATER RESOURCES
 NORTHERN BRANCH
 LAND AND WATER USE
 TRINITY RIVER HYDROGRAPHIC UNIT
LAND AND WATER USE
 T 33 N, R 7-9 W M088M
 1957

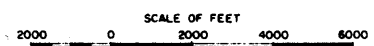


TABLE 5 (Continued)
DESCRIPTIONS OF SURFACE WATER DIVERSIONS IN
TRINITY RIVER HYDROGRAPHIC UNIT

Location number and/or Plate 2 sheet number	Diversion name and/or owner	Source	Water use in 1957				Apparent water right			Indicated date of appropriation or first use	Description of diversion system	Remarks
			Purpose	Extent and method of use	Amount diverted in acre-feet		Type	Amount	Reference			
<u>M D B & N</u>												
3M/94-2471 (Sheet 19)	Henry Durham	Trinity River	Irrig.* (*)		None		Riparian	--	--	About 1970	Pump; 1-hp motor with 2-inch pipeline and earth ditch.	Former owner: Goodings. Irrigated 8 acres by flooding until 1957.
3M/94-2481 (Sheet 19)	Ben Wellock	Grass Valley Creek	Irrig.	3 acres by flooding	72		Riparian	--	--	1935	Gravity; timber dam 4 feet high, 15 feet long, with 30 feet of 12-inch pipe and 0.1 mile of earth ditch.	
3M/94-3521 (Sheet 19)	Bernie I. and Leslie Leas	Grass Valley Creek	Irrig. Domestic (c)	16 acres by flooding	540		Approp.	100 MI	--	About 1954	Gravity; brush and gravel dam 1 foot high, 15 feet long, with short wood flume and 0.6 mile of earth ditch.	Former owners: Fred and Louis Frey.
3M/94-3521 (Sheet 19)	Ralph Leeper, Arthur E. Lunden	Grass Valley Creek	Irrig.	87 acres by flooding	1,065		Approp.	125 MI	--	About 1952	Gravity; timber dam 4 feet high, 30 feet long, with 1 mile of earth ditch.	Former owners: Lunden, Siligo, Edwards, Leavitt.
3M/94-3521 (Sheet 19)	Ralph Leeper	Grass Valley Creek	Irrig.* (*)		None		Approp.	--	--	Prior 1957	Gravity; earth dam with 0.5 mile of earth ditch.	Irrigated 17 acres by flooding until 1957.
3M/94-3521 (Sheet 19)	Floyd and Grover Lorenz	Dutton Creek	Irrig. Stock.	7 acres by flooding	221		Riparian	--	--	About 1970	Gravity; rock and sandbag dam 1 foot high, 10 feet long, with 0.2 mile of earth ditch.	Former owners: John Hurst, Isaacs.
3M/94-3521 (Sheet 16)	Horton Ditch Frank Costa, et al.	Rush Creek	Irrig. Domestic Mining* (*)	13 acres by flooding and furrow	726*		Riparian	--	--	About 1860	Gravity; log and timber dam with 150 feet of 20-inch pipe and 0.6 mile of earth ditch.	Portion of amount diverted supplemental 3M/94-1081. Supplied placer mine until 1957.
3M/94-1681 (Sheet 16)	Junkens Ditch Frank Costa, et al.	Rush Creek	Irrig. Mining* (*)	28 acres by flooding and furrow*	1,214		Approp.	20.5 cfs	A-9223b	About 1860	Gravity; rock dam with 0.6 mile of earth ditch and 26-inch penstock.	Area irrigated received supplemental supply from 3M/94-381 through Bear Gulch. Supplied placer mine until 1957.
3M/94-1601 (Sheet 16)	Frank Costa, et al.	Rush Creek	Mining* (*)		None		Approp.	22.5 cfs	A-9196b	About 1860	Gravity; log and rock dam with 0.8 mile of earth ditch.	Supplied placer mine until 1957.
<u>H B & N</u>												
6M/68-1211 (Sheet 11)	Hermis W. Dailey	Panther Creek	Mining Irrig. Domestic	Placer mine 11 acres by flooding	2,017		Approp.	1.25 cfs 7.0 cfs	A-5018b A-10880b	1926 1944	Gravity; 1 mile of earth ditch.	Former owners: Moss Patterson, J. J. Dailey, V. A. Dailey.
6M/68-1211 (Sheet 11)	Viola A. Dailey	Happy Camp Creek	Irrig. (*)		(*)		(c)	--	--	1862	Gravity; concrete box 3 feet wide, 3 feet high, with 200 feet of earth ditch and 10-inch pipe flume to junction with 6M/68-1212.	Former owners: Moss Patterson, J. J. Dailey. Amount diverted and details of use reported under 6M/68-1212.

* See remarks
-- Information not available
For lettered footnotes, see last page of table.

TABLE 6 (Continued)
MONTHLY RECORDS OF SURFACE WATER DIVERSIONS IN
TRINITY RIVER HYDROGRAPHIC UNIT, 1957

Location number	Diversion name or owner	Use	Point of measurement or estimate	Method of observation and calculation	Amount diverted, in acre-feet												Remarks	
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		Total
MIDDLE TRINITY SUBUNIT (Continued)																		
M D B & H 32N/9M-310L	Clifford and Fred Ross	Irrigation 4/26/57 - 9/26/57	0.1 mile below intake	Staff gage and depth-flow relationship	0	0	0	40°	394	274	281	224	338	471	0	0	2,022*	Reported amount diverted after 9/26/57 spilled.
32N/9M-333R	T. R. Nelson T. Wallace	Irrigation 4/9/57 - 9/28/57; mining, and domestic	0.3 mile below intake	Water-stage recorder and depth-flow relationship	(238)* (57)	----- NR (18)	----- * (213)	----- * (290)	275	397	397	291	193	172	211	231	1,859 (727)*	Amounts in parentheses are measurements made in 1958.
32N/10M-108L	Bert A. Phillips	Irrigation 5/28/57 - 9/17/57	At pump	Pump test and power records	0	0	0	0	1	11	17	17	8	0	0	0	54	
32N/10M-128L	United States Plywood Corp.	Industrial 4/25/57 - 9/18/57	At pump	Pump test and operation record	0	0	0	13	78	45	44	52	18	0	0	0	250	
32N/10M-130L	L. V. Jordan	Irrigation 4/15/57 - 9/26/57	0.2 mile below intake	Staff gage and depth-flow relationship	0	0	0	60°	60°	52	129	106	88	130°	120°	120°	865*	Reported amounts diverted after 9/26/57 spilled.
32N/10M-140L	L. V. Jordan	Irrigation 4/15/57 - 9/28/57	0.1 mile below intake	Staff gage and depth-flow relationship	0	0	0	130°	250°	196	182	135	101	0	0	0	994	
33N/8M-150L	Harold J. and Mary J. Wilson	Irrigation 6/1/57 - 9/26/57	1 mile below intake	Staff gage and depth-flow relationship	0	0	0	0	85	46	38	33	0	0	0	0	202	
33N/8M-200L	Harold J. and Mary J. Wilson	Irrigation 7/13/57 - 9/26/57	0.1 mile below intake	Staff gage and depth-flow relationship	0	0	0	0	0	21	34	27	0	0	0	0	82	
33N/9M-121L	William B. Wright	Irrigation 6/1/57 - 9/26/57; stockwatering, domestic, and power	30 feet below intake	Staff gage and depth-flow relationship	60° 50°	50°	50°	50°	56	61	25	30	40	100°	50°	60°	632*	Reported amounts diverted prior to 6/1/57 and after 9/26/57 includes an undetermined amount of spill.
33N/9M-26EL	Ben Mallock	Irrigation 6/26/57 - 9/18/57	50 feet below intake	Staff gage and depth-flow relationship	0	0	0	0	0	18	23	22	9	0	0	0	72	
33N/9M-35GL	Bernie I. and Leslie Leas	Irrigation 5/12/57 - 9/26/57 and domestic	0.1 mile below intake	Staff gage and depth-flow relationship	0	0	0	0	79	147	44	41	39	70°	60°	60°	540*	Reported amounts diverted after 9/26/57 includes an undetermined amount of spill.
33N/9M-35DL	Ralph Leeper Arthur E. Lundon	Irrigation 4/26/57 - 9/26/57	0.5 mile below intake	Staff gage and depth-flow relationship	0	0	0	17	204	128	163	190	173	70°	60°	60°	1,065*	Reported amounts diverted after 9/26/57 spilled.
Ranch Ditch																		
33N/10M-35FL	Floyd and Grover Lorens	Irrigation and stockwatering 4/1/57 - 9/19/57	30 feet below intake	Staff gage and depth-flow relationship	0	0	0	50°	61	46	36	24	4	0	0	0	221	Source dry 9/19/57
34N/9M-88L	Huston Ditch	Irrigation and domestic 5/26/57 - 9/26/57	0.1 mile below intake	Staff gage and depth-flow relationship	0	0	0	170°	180°	184	110	60	22	0	0	0	726	
34N/9M-168L	Junkans Ditch	Irrigation 4/1/57 - 9/26/57	0.2 mile below intake	Staff gage and depth-flow relationship	0	0	0	240°	270°	379	187	92	46	0	0	0	1,214*	Reported amount diverted includes an estimated 0.1 cfs supplemental supply from Bear Gulch.

* See remarks
° Monthly value estimated
---*--- Diversion estimated for period indicated
---NR--- No record for period indicated

TABLE 9 (Continued)
IRRIGATED LANDS IN
TRINITY RIVER HYDROGRAPHIC UNIT, 1957
(in acres)

Location number	Diversion name or owner	Pasture			Alfalfa hay and pasture	Other hay and grain	Field crops	Orchard	Truck crops	Total lands irrigated	Idle irrigated lands	Total
		Mixed	Native	Meadow								
<u>M D B & M</u>					MIDDLE TRINITY SUBUNIT							
32N/9W-30W1	H. R. and W. L. Halverson T. S. Kimbel Albert L. and Emily Shapley William and Lilley Williams										10	10
32N/9W-4E1	Reo D. Stott										24	24
32N/9W-5P1	Bert A. Phillips				32					32		32
32N/9W-8Q1	Melvin E. Dale Alvis Rais	10			27					37		37
32N/9W-31Q1	Clifford and Fred Ross	18			28					46		46
32N/9W-33R1	T. R. Nelson T. Wallace		128							128		128
32N/10W-10R1	Bert A. Phillips	36								36		36
32N/10W-13N1	L. V. Jordan				15					15		15
32N/10W-14Q1	L. V. Jordan	9			10					19		19
33N/8W-15W1	Harold J. and Mary J. Wilson	25								25		25
33N/8W-20H1	Harold J. and Mary J. Wilson	5								5		5
33N/9W-12L1	William B. Wright		18							18		18
33N/9W-24F1	Henry Durham										8	8
33N/9W-26E1	Ben Wellock	3								3		3
33N/9W-35C1	Bernie I. and Leslie Leas	13	3							16		16
33N/9W-35D1	Ralph Leeper Arthur E. Lunden	87								87		87
		Ranch Ditch										

* Received partial irrigation

TABLE 9 (Continued)
IRRIGATED LANDS IN
TRINITY RIVER HYDROGRAPHIC UNIT, 1957
(In acres)

Location number	Diversion name or owner	Pasture			Alfalfa hay and pasture	Other hay and grain	Field crops	Orchard	Truck crops	Total lands irrigated	Idle irrigated lands	Total
		Mixed	Native	Meadow								
<u>M D B & M</u>					MIDDLE TRINITY SUBUNIT (Continued)							
33N/9W-35H1	Ralph Leeper				DWR - Upper Terrace						17	17
33N/10W-35F1	Floyd and Grover Lorenz	7								7		7
34N/9W-8H1	Huston Ditch				13					13		13
34N/9W-16B1	Junkans Ditch					28				28		28
	Total Middle Trinity Subunit	213	149	0	125	28	0	0	0	515	59	574
<u>H B & M</u>					NEW RIVER SUBUNIT							
6N/6E-12H1	Hermis W. Dailey	5			6					11		11
6N/6E-12L2	Viola A. Dailey	14			8			32		54		54
6N/6E-12L1												
7N/7E-28M1	Grover and Willard Ladd	2			13		7			22		22
7N/7E-7P1	(Hoopa Subunit)											
	Total New River Subunit	21	0	0	27	0	7	32	0	87	0	87
<u>M D B & M</u>					TRINITY RESERVOIR SUBUNIT							
35N/7W-7H1	John Nielsen										22	22
35N/7W-17D1	John Nielsen	14	19							33		33
35N/8W-9X1	Louis J. and Nora M. Kersch		10							10		10
35N/8W-10E1	Louis J. and Nora M. Kersch		10							10		10
35N/8W-10L1	Katherine S. Hubbard Louis J. and Nora M. Kersch		45							45		45
35N/8W-19P1	Cedar Stock Ranch										75	75

* Received partial irrigation

APPENDIX F

CONSTRUCTION OF DWR POOLS

APPENDIX F

CONSTRUCTION OF DWR POOLS

Design and construction of the sediment trap pools is described in annual reports. However, a general discussion of their construction is included because the way the pools were originally constructed could affect the approach to maintaining them. Figure F-1 is a contour map of the completed pools.

Upper Pool Construction

Construction began when a culvert was installed in Grass Valley Creek. The culvert allowed equipment to cross without disturbing fish passage or increasing downstream turbidity. Next, vegetation was removed from the site. Then hydraulic scrapers, assisted by bulldozers, removed dry layers of sand from both sides of the creek.

Dry material west of the creek was excavated down to the water table. A berm with a shallow channel was left along the west bank to use as a diversion channel. Its outlet was to the original creek bed at the downstream end of the pool site. After excavating material east of the creek, the flow was diverted into the diversion channel and the creek bed was excavated.

When the equipment got into wet material at the ground water table, a hydraulic excavator was brought in to excavate down to the cemented gravel bottom. The excavator loaded sediment directly into the scrapers. Boulders and large cobble was sorted out by the excavator to use for facing the spillways and pool banks. The berm has been left in place to use for future dredging projects.

A 6-inch water pump was used to drain the construction area. This allowed the scrapers and the excavator to clear the pool bottom. A tractor with a ripper attachment was used to loosen cemented bottom material. Some of this material was removed to smooth up the pool bottom, but time and budget constraints limited this work to just a few feet of depth.

By ripping the pool bottom, it could be made considerably deeper. Water well drillers records for wells in the immediate vicinity show cemented gravels extend from 50 to 80 feet below the surface.

After the pool bottom was finished, construction of the outlet began. Sandy material was removed from the outlet site. Then it was backfilled with rocky material and faced with boulders. However, since the pool filled very quickly, the contractor had difficulty working with equipment in the new wet fill.

Figure F-1



California Department of Water Resources, Northern District
DWR-Hamilton Ranch Sediment Control Pools

A low depression was left down the middle of the outlet to make a low-flow channel. Boulders strategically placed in this channel provide resting pools for migrating fish.

At the upper pool inlet, sandy material on the banks was protected by layers of boulders. The bottom of the inlet was not faced with boulders because the stream bottom consisted of large rock.

If this pool is drained to deepen it in the future, a culvert should be installed in the west bank of the outlet to allow water from the west diversion channel to bypass the pool area. The culvert should have baffles to aid fish passage. A similar culvert was installed during construction of the lower pool outlet. The 1989 project evaluation report contains details of this construction.

Lower Sediment Control Pool

The lower pool was constructed using a similar method to the upper one. Creek water was again diverted around the west side of the pool area and excavation was done in stages.

A culvert used to cross the creek was installed in the upper pool outlet. A 4-foot-diameter steel culvert containing steel baffles to aid fish passage was installed in the west bank of the downstream outlet site. Water was then diverted around the pool site and through the pipe. This allowed equipment to cross the creek at both ends and to have free access to the middle of the pool area.

Draining was accomplished by a 6-inch pump. A D8K Caterpillar tractor was used to rip the cemented gravels for removal. Again, time and funding allowed only a few feet of material removal.

The outlet from the upper pool was extended and faced with rock to reach the new pool bottom. A second outlet was constructed to the east. Its crest elevation was approximately the same as the first, but does not contain a low water channel. This outlet should help sediment to fill both the upper and lower pool evenly across most of their widths.

The lower outlet was constructed in a similar manner to the upper pool outlet. However, since all water was being diverted around the construction, working conditions were essentially dry. This made it easier to compact the fill and complete the rock facing without rising water levels affecting the work.

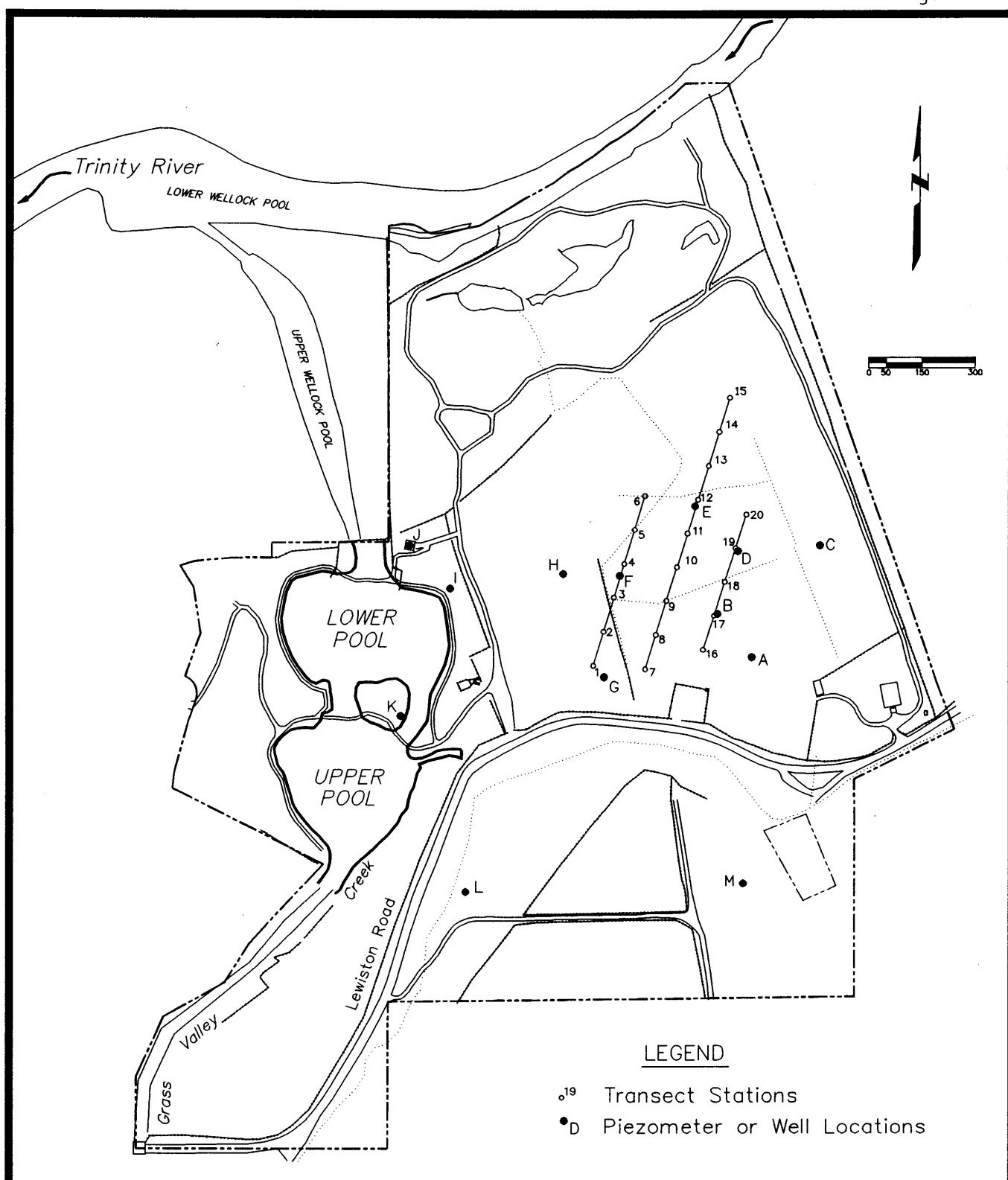
After the lower outlet was completed, the stream was moved back to the upper pool low water channel, and the culverts removed. Then as the pool began to fill, the 48-inch culvert was capped on both ends and buried to protect it from damage from debris during floodflows. As the pool filled, water flowed out the low-flow channel.

In order to use the fish passage culvert in the future, both ends must be excavated and uncapped. Some of the excavated material will probably be used to build a temporary dike around the entrance. Then a temporary flash board box structure could be installed between the pipe and the dike. After the pipe is uncapped, the boards could be removed one by one to lower the water levels in the pool. This way, no uncontrolled wash of water would affect the creek downstream and turbidity would not be increased.

APPENDIX G

PRIMARY DISPOSAL AREA - WETLAND TRANSECTS AND PIEZOMETER WATER LEVELS

Figure G-1



California Department of Water Resources, Northern District

DWR-Hamilton Ranch Piezometer, Well & Wetland Transect Locations

DWR-HAMILTON RANCH WETLAND TRANSECTS

NUMBERS = INCHES OF STANDING WATER

A CHARACTER INDICATES SOIL MOISTURE CONTENT WITHOUT STANDING WATER

DATE	STATION																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
01/10/88	3	3.5	5.5	0	3	4.3	.5	.5	18	0	0	0	2	1.2	0	0	0	0	0	0
01/17/88	1.5	2.8	0	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0
01/28/88	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0
01/30/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/06/88	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	.8	0	0
03/27/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/18/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/23/88	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	.5	0	0
05/01/88	0	0	0	0	0	0	0	0	8.5	0	0	0	0	0	0	0	0	.5	0	0
05/11/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/01/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/19/88	0	0	0	0	0	0	0	0	6.5	0	0	0	0	0	0	0	0	.5	0	0
07/31/88	D	0	D	D	0	0	D	D	14	0	0	0	0	0	0	.1	.2	1.5	0	0
08/17/88	D	D	D	D	D	D	D	D	12	D	D	D	D	D	D	S	S	1.5	D	D
09/11/88	D	D	D	D	D	D	D	D	12	D	D	D	D	D	D	S	S	.2	D	D
10/09/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/29/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/19/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/04/88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/14/89	.2	W	W	W	W	W	W	W	9	W	W	W	W	W	W	1.5	1.5	1	W	W
01/29/89	S	W	W	D	0	0	W	W	7.8	0	0	0	0	0	0	.2	.2	.8	D	D
02/12/89	W	D	D	D	D	D	W	W	4.5	W	D	D	0	0	0	W	S	S	D	0
02/25/89	W	D	D	W	W	D	W	W	W	D	D	D	D	D	D	W	W	W	W	D
03/19/89	.5	2	W	W	W	W	S	S	7	W	W	W	W	W	W	1.5	1	1	W	W
04/07/89	S	1	W	W	D	D	S	S	7	D	D	D	D	D	0	W	2	1	D	D

S=SATURATED SOIL W=WET SOIL D=DAMP SOIL 0=NO WATER

DWR-HAMILTON RANCH WETLAND TRANSECTS (continued)

BEGINNING 4/26/89 SOIL MOISTURE CONTENT WAS RATED ON A SCALE OF 1 TO 10, WITH HIGHER NUMBERS BEING DRYER.

NUMBERS WITHOUT CHARACTERS = INCHES OF STANDING WATER

DATE	STATION																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
04/26/89	D4	W2	W3	W3	W3	D4	W2	W3	3	D4	D4	D4	D4	D4	D4	W3	S1	S1	D4	D4
05/14/89	0	0	0	0	0	0	0	0	D2	0	0	0	0	0	0	D2	D2	0	0	0
05/29/89	0	0	0	0	0	0	D	0	D	0	0	0	0	0	0	D3	D3	D4	0	0
07/10/89	A8	D4	A9	A8	A8	A9	A7	A8	A7	A8	A7	A8	A9	A9	A9	A7	A9	A7	A8	A8
08/27/89	A9	D6	A10	A8	A9	A8	A7	A9	A10	A8	A9	A9	A10	A10	X	A8	A8	A7	A9	A9
10/01/89	D4	D4	D5	D4	D4	X	D4	D4	D4	D4	D5	D5	D5	D6	X	D4	D6	D5	D4	D5
10/29/89	W2	W3	D5	D4	X	X	W2	W3	W2	W3	D4	D4	D5	X	X	W3	W3	W3	W3	D4
01/15/90	D5	D5	D5	D5	X	X	D6	D6	7	D5	D6	D5	D5	X	X	.25	.25	1	D5	D5
05/18/91	A7	A7	A7	D6	X	X	D6	D5	W3	D4	D5	A7	X	X	X	D4	W2	W2	D6	D6
02/23/92	W2	W2	D5	D5	X	X	S1	W2	9	D5	D5	D5	X	X	X	.5	.5	1	D4	D5
03/21/92	D4	D5	W3	D4	X	X	D4	D4	A7	D5	D5	D4	X	X	X	W2	S1	S1	D5	D5
08/08/92	A8	A7	A8	A8	X	X	A8	A8	D4	A8	A8	A8	X	X	X	D6	S1	S1	A9	A10
06/04/93	W2	W3	W2	W2	X	X	W3	W2	6	W3	W3	W2	X	X	X	1	1	2	W2	S1

S1=SATURATED SOIL W(2-3)=WET SOIL D(4-6)=DAMP SOIL A(7-10)=DRY SOIL 0=NO WATER X=STATION DESTROYED BY CONSTRUCTION

DWR-HAMILTON RANCH PIEZOMETER AND WELL MEASUREMENTS
PIEZOMETERS INSTALLED OCTOBER 4-5, 1988

WATER LEVEL MEASURED FROM GROUND SURFACE IN INCHES

LOCATION													
DATE	A	B	C	D	E	F	G	H	I	J	K	L	M
10/09/88	M	1.5	D	D	D	49.8	47.2	D	D	93	77.5	D	360
10/29/88	D	34	D	D	D	D	M	D	D	99	98.5	D	357.6
11/19/88	D	8.7	D	D	D	D	D	D	D	93.6	76.5	D	393.4
12/04/88	M	0	M	M	M	31.5	46	M	M	87	67.2	17	430.8
12/08/88	M	1.5	M	M	M	37	42	M	M	90	69.6	20	355.2
01/14/89	32	-1.5	42	50.5	M	17	0	35	46.5	80	65	0	162
01/29/89	38	-1.25	46.25	47	M	16.5	12	36.5	49.2	82.5	65.5	0	163
02/12/89	M	1	M	M	M	27	29	48	M	86	70	3.5	271
02/25/89	M	1.5	M	M	M	31.5	30	M	M	89	68	6	176
03/19/89	35	-3	10.5	12.5	14	2	0	-.5	28	66	48	-1	85
04/07/89	0.25	1.5	32.5	31.2	33	7.5	5	17.5	39	72	65	0	166
04/26/89	M	1	58	50.5	M	22	23	44	M	83	77	4	270
05/14/89	M	3	M	M	M	38	49	M	M	88	80	21	303
05/29/89	M	8	M	M	M	M	M	M	M	83	84	26	320
07/10/89	D	31	D	M	M	M	M	D	D	104	86	33	335
08/27/89	D	M	D	D	D	M	M	D	X	217	86	M	349
10/01/89	M	M	M	M	M	33	M	X	X	108	76	33	364
10/29/89	M	17	M	M	M	39	M	X	X	94	X	15	354
01/15/90	36.5	0	M	M	M	29	27	X	X	84	X	0	140
05/18/91	M	16	M	M	M	16	43.5	X	X	97	X	24	*
02/23/92	34.5	-1.5	40.5	33.5	18	34	15	X	X	78	X	-.5	107
03/21/92	44.5	1	36	32	38	22	21	X	X	163	X	0	119
08/08/92	M	3.5	M	D	M	25	M	X	X	114	X	*	*ORCHARD IRRIGATED FOR 4 WEEKS
08/24/92	D	M	D	D	D	26	M	X	X	115	X	*	*IRRIGATION OFF FOR 2.3 WEEKS
1/06/04/93	40.5	-1	23	41	46	10	22	X	X	82	X	0	109
1/07/29/93	D	41	D	M	M	12.5	M						

D=DRY-NO WATER IN PIEZOMETER M=MOIST SOIL-NO STANDING WATER IN PIEZOMETER

0=STANDING WATER AT GROUND LEVEL "-"=STANDING WATER ABOVE GROUND LEVEL

X=STATION DESTROYED BY CONSTRUCTION *=NOT CHECKED

1/ IRRIGATION WATER TURNED ON AFTER THESE RECORDINGS